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PART V

CONSUMER PRODUCT SAFETY COMMISSION

■

ARCHITECTURAL GLAZING MATERIALS

Establishment of Safety Standards

Title 16—Commercial Practices

CHAPTER II—CONSUMER PRODUCT SAFETY COMMISSION

PART 1201—SAFETY STANDARD FOR ARCHITECTURAL GLAZING MATERIALS

Establishment of Standard

In this document, the Consumer Product Safety Commission issues a consumer product safety standard for architectural glazing materials (16 CFR Part 1201), effective July 6, 1977 except for wired glass used in doors or other assemblies to retard the passage of fire where such doors or other assemblies are required by a federal, state, local or municipal fire ordinance, for which the standard is effective January 6, 1980, as provided in § 1201.7 of this Part 1201. The standard is intended to reduce the unreasonable risks of injury associated with architectural glazing materials by ensuring that the glazing materials used in certain architectural products either do not break when impacted with a certain energy, or break with characteristics that are less likely than other glazing materials to present an unreasonable risk of injury.

The injuries this standard is designed to reduce or eliminate are as follows:

A. Lacerations, contusions, abrasions, and other injury or death resulting from walking or running into glazed doors or sliding glass doors believed to be open or glazed panels mistaken as a means of ingress or egress, or pushing against glazing material in doors or glazed panels in an attempt to open a door.

B. Lacerations, contusions, abrasions, and other injury or death resulting from accidentally falling into or through glazing material in doors, sliding glass doors, glazed panels, bathtub doors and enclosures and shower doors and enclosures.

C. Lacerations, contusions, abrasions, and other injury or death resulting from the act of installing, replacing, storing or otherwise manipulating glazing material in doors, sliding glass doors, glazed panels, bathtub doors and enclosures and shower doors and enclosures, or from broken glass in doors, sliding glass doors, glazed panels, bathtub doors and enclosures and shower doors and enclosures.

Copies of all the documents, data, information relative to the original petition for a standard, the Commission's decisions thereon and other materials reviewed and considered by the Commission and/or the staff, in connection with the development of the proposed standard and the final standard, or otherwise mentioned in this notice are available for public inspection in the Office of the Secretary, 1111 18th Street, N.W., 3rd Floor, Washington, D.C. 20207.

I. Background

On June 20, 1973, the Consumer Safety Glazing Committee (CSGC) petitioned the Commission under section 10 of the Consumer Product Safety Act (15 U.S.C. 2059) (hereinafter referred to as CPSA or act) to commence a proceeding for the development of a consumer product safety standard to address the hazards associated with architectural glass. CSGC is an ad hoc group of industry, labor and general interest groups initially formed in 1968 for the purpose of drafting and lobbying for passage of a Model Safety Glazing bill in the various states.

On November 1, 1973, the Commission granted the CSGC's petition on the basis of information submitted by CSGC, consideration of injury data reported by the National Electronic Injury Surveillance System (NEISS), and review of data and information gathered by the National Commission on Product Safety.

Thereafter, the Commission commenced a proceeding under section 7 of the act (15 U.S.C. 2056) to develop a consumer product safety standard applicable to architectural glass by publishing a notice in the FEDERAL REGISTER of May 28, 1974 (39 FR 18502). In the proceedings prior to publication by the Commission in the FEDERAL REGISTER of the proposed standard on February 11, 1976 (41 FR 6178), the product covered by the standard was referred to as "architectural glass". Commencing with the publication of the proposed standard, the designation of the product was changed to "architectural glazing materials". The change was made because the term "architectural glazing materials" includes materials that may consist in whole or in part of materials other than glass. As indicated in the notice of proceeding, the Commission had intended the standard to cover glass and non-glass glazing materials.

In the notice of proceeding, the Commission preliminarily determined (1) that hazards associated with architectural glass present unreasonable risks of injury or death and (2) that one or more consumer product safety standards are necessary to eliminate or reduce those unreasonable risks of injury. The notice included an invitation to interested persons to submit offers to develop a recommended safety standard, or to submit an existing standard as a proposed product safety standard.

Four offers were received and two existing voluntary standards were submitted in response to the notice of proceeding. In the FEDERAL REGISTER of August 21, 1974 (39 FR 30191), the Commission announced its acceptance of a CSGC offer to develop a recommended standard. CSGC submitted a recommended standard to the Commission on January 24, 1975.

On February 11, 1976, the Commission published a proposed standard in the FEDERAL REGISTER (41 FR 6178) for public comment in accordance with sections 7 and 9 of the CPSA (15 U.S.C. 2056 and 2058). The proposed standard was designed to reduce or eliminate the unreasonable risks of injury associated with architectural glazing materials by ensuring that the glazing materials used in certain architectural products either do not break when impacted with a certain energy or break with characteristics that are less likely than other glazing materials to cause an unreasonable risk of injury. The proposed standard is basically the standard which was recommended by CSGC with certain revisions, additions, and deletions made by the Commission's staff in response to direction by the Commission.

A more complete discussion of the Commission's consideration of the CSGC recommended standard, the rationale for the changes made in that standard and a description of the provisions of the proposed standard were set forth in the preamble of the proposal of February 11, 1976. A discussion of the preliminary determination of unreasonable risk associated with architectural glazing materials, and a discussion of the technical rationale which formed the basis for the Commission's proposal of the standard were also set forth in that preamble.

In the FEDERAL REGISTER of April 15, 1976 (41 FR 15873), the Commission announced the extension of the period by 60 days, or until June 11, 1976, in which it must either issue a final consumer product safety standard for architectural glazing materials, or withdraw the notice of proceeding. In the FEDERAL REGISTER of July 7, 1976 (41 FR 27952), the Commission announced a further extension of this period until December 1, 1976, due to the complexity and variety of the technical issues raised in the public record requiring staff review and analysis.

II. Description of the Standard

The standard, 16 CFR Part 1201 published below, prescribes safety requirements for glazing materials manufactured after its effective date for use in storm doors or combination doors, doors used for human passage (both exterior and interior), shower and bathtub doors and enclosures, certain glazed panels, and sliding or patio-type doors. The standard also requires that the architectural products enumerated above which incorporate glazing materials and which are manufactured after the effective date of the standard be constructed with glazing materials that meet the requirements of the standard. Thus, the glazing materials and architectural products incorporating those glazing materials manufactured after the effective date of the standard must meet the requirements of the standard.

While the standard issued below prescribes a test method to determine whether glazing materials subject to the standard meet the requirements of the standard, the standard itself does not require that a manufacturer test any glazing materials or products subject to the standard. Manufacturers of glazing material, however, are required to perform testing under section 14 of the Consumer Product Safety Act (15 U.S.C. 2063) which prescribes certification requirements. The Commission will establish regulations regarding certification by a separate rulemaking proceeding. However, the Commission intends to use the test procedures set forth in the standard issued below to determine whether materials and products subject to the standard meet the requirements of the standard.

The standard is designed for residential and certain nonresidential applications. It does not cover glazing materials used in the manufacture and construction of architectural products not identified in the standard such as (but not necessarily restricted to) prime windows and storm windows.

After the effective date of the standard, no person shall manufacture for sale, offer for sale, distribute in commerce or import into the United States glazing material or the enumerated products incorporating glazing materials subject to the standard which do not comply with the requirements of the standard.

For purposes of this standard, fabricators (persons who assemble or otherwise incorporate glazing materials into the architectural products identified) are considered to be manufacturers as defined in § 1201.2(a) (15) and (16) of the standard and sections 3(a)(4) and 3(a)(8) of the act (15 U.S.C. 2052(a)(4) and (a)(8)). Distributors and retailers of glazing materials (including persons cutting glazing materials to size) are also subject to the standard. The effective date for the standard is July 6, 1977, except for wired glass used in doors or other assemblies to retard the passage of fire, where such doors or other assemblies are required by a federal, state, local or municipal fire ordinance, for which the standard is effective January 6, 1980 as provided in § 1201.7 of this Part 1201.

The standard, Part 1201 below, is designed to reduce or eliminate the unreasonable risks of injury associated with architectural glazing materials by ensuring that the glazing materials used in certain architectural products either do not break when impacted with a certain energy or break with characteristics that are less likely than other glazing materials to present an unreasonable risk of injury. The standard is basically the standard which was proposed by the Commission with certain revisions, additions, and deletions made in response to the comments submitted on the proposal by interested persons. The major provisions of Part 1201, and the principal differences from the proposed standard are described below. The Commission provides further explanations for the changes and addresses comments on the proposed standard under Section III of the preamble entitled "Response to the Proposal."

A. *Impact tests.* In § 1201.2 of the standard, affected products are defined and divided into two categories according to the expectation of whether in normal use or during reasonably foreseeable misuse they will be subjected to high energy or low energy impact and whether it is likely that an individual's full body will be involved in the impact. Included in the final standard is a revision in the definition of Category I and Category II doors and glazed panels. The dividing line is now 9 square feet rather than 6 square feet. (§ 1201.2(a) (3) and (4) below). Section 1201.4(d)(1) describes the impact tests for both categories. The requirements for impact kinetic energy of 150 foot pounds for Category I products (impact from a drop height of 18 inches) and 400 foot pounds for Category II products (impact from drop height of 48 inches) have been retained in the final standard.

B. *Breakage characteristics.* The standard, at § 1201.4(e)(1), provides that glazing materials when impacted as required must either not break, or break with one of a series of alternative acceptable breakage characteristics. These breakage characteristics are similar to the ones proposed, but have been revised as described below.

1. For reasons detailed in Section III (C)(2)(a)(3) of this preamble, § 1201.4(e)(1)(i), which describes a criterion for passing the impact test, has been revised to specify the period of time that a sphere should remain on the glazing material after it has been placed in a horizontal position.

2. Also for reasons detailed in Section III(C)(2)(c)(2) of this preamble, § 1201.4(e)(1)(ii), which describes a criterion for passing the impact test, has been revised by deleting the term "crack free" and by adding a definition of the term "particle" for purposes of this section. The purpose of these changes is to require that large shards having cracks that terminate in the shard be considered in determining the 10 largest pieces to be selected.

3. The standard does not require, as a criterion for passing the impact test, that glazing meet an included angle criterion. The Commission's position on this matter is further detailed in section III (C)(2)(d) of this preamble.

C. *Environmental durability tests.* Section 1201.4(a)(2) of the standard requires that accelerated or simulated weathering tests be conducted to ensure environmental durability of the glazing materials.

1. Section 1201.4(d)(2)(i) of the proposed standard specified a boil test procedure which included a first soak and a second soak (immersion) of test specimens. This requirement has been retained in that section of the final standard since the standard sets forth the manner in which the Commission will test for compliance with the standard. The first soak may be made optional for manufacturers of glazing materials in the Commission's certification testing program which will be published in another document. This is further discussed in part III(C)(3)(a)(1) of this preamble.

2. Section 1201.4(b)(3)(ii) regarding the simulated weathering test has been revised to eliminate the use of the carbon arc test equipment and to specify the type of xenon arc test equipment that will be used by the Commission to determine compliance with the standard. This is also further discussed in part III(C)(3)(a)(2) of this preamble.

D. *Glazed panel definition.* The definition of "glazed panel" included in §§ 1201.2(a)(10)(i) and 1201(a)(10(ii) of the standard has been revised to exclude transoms by restricting the definition of glazed panels to those "* * * whose bottom edge is below the level of the top of the door * * *". This addition clarifies that transoms and other glazed panels beginning above door level are not included within the standard.

E. *Exemptions to Part 1201.* Certain product exemptions to this Part 1201 have been included in § 1201.1(c) of the standard. The rationales for such exemptions are detailed in section III(A) of this preamble.

The Commission has deferred the applicability of the standard to wired glass used in doors or other fire assemblies to retard the passage of fire where such doors or other assemblies are required by a federal, state, local, or municipal fire ordinance for 2½ years from the effective date of the standard. A total exemption from the requirements of the standard has been provided for the louvers of jalousie doors as that term is defined in § 1201.2(a)(12). Non-complying glazing materials may be used in any door opening provided that a 3-inch diameter sphere cannot pass through the opening. This Part 1201 does not apply to the curved sidelights of revolving doors. Decorative leaded glass is excluded from the provisions of Part 1201 when no individual pane is greater than 30 square inches in area. Commercial refrigerated glass cabinet doors are also exempted. The basis for these exemptions is explained in section III(A) of this preamble.

III. Response to the Proposal

In response to the proposal of February 11, 1976, fifty-four written comments were received. In addition, a proceeding to receive oral comments was held on March 8, 1976, at the offices of the Commission in Washington, D.C. Oral comments were made by representatives of eight organizations. The principal issues raised by the comments and the Commission's conclusions thereon are set forth below. Significant revisions in the final standard resulting from the comments and/or Commission decisions are also discussed.

In addition, eight individual consumers expressed their approval of the Commission's action to increase the safety of architectural glazing materials and to reduce the number of injuries connected with architectural glazing products. One consumer expressed disapproval of a testing standard and recommended a labeling standard instead.

A. *Scope and application; exemptions.* A number of comments were received relating to § 1201.1 which deals with the scope and application of the proposed standard and the ancillary § 1201.2 setting forth definitions of terms used in the proposed standard.

1. *Glazed panels.* a. PPG Industries commented on § 1201.2(a)(10)(iv)(B) of the standard which exempts from the standard panels that have a visual barrier in the form of a horizontal member such as a piece of framing or a permanent chair rail of specified dimensions and location. PPG objected to this exemption on the grounds that this section does not provide for an adequate physical barrier.

One of the modes of injury associated with glazed panels is that of the person

who walks or runs into the glazed panel because he/she fails to see the glazing and believes that the area is a passageway—an open door. The standard is designed to reduce or eliminate this mode of injury by providing for the use of a visual barrier when safety glazing is not used. Therefore, the Commission has not accepted the change recommended by PPG because the Commission does not intend the horizontal member to be a physical barrier.

b. The Federal Housing Administration (FHA) of the Department of Housing and Urban Development suggested in a comment that the Commission narrow the allowable range of heights for this visual barrier, i.e., 18 to 36 inches above the walking surface, because a single barrier at the 18 inch level might contribute to the severity of injury.

The Commission agrees that a barrier at 18 inches may be ineffective as a visual barrier and, in addition, may present a hazard of tripping. The Commission, therefore, has raised the minimum level to 24 inches for this visual barrier. The new range would continue to afford protection to children as well as adults, as a visual barrier, while reducing the risk of tripping by adults. Therefore, the Commission has revised the definition of glazed panel as contained in § 1201.2(a)(10)(iv)(B) to exempt from coverage as glazed panels those panels in nonresidential buildings which are not adjacent to doors and which have horizontal members located between 24 and 36 inches above the walking surface.

FHA also suggested an exemption for glazed panels having a painted stripe or design as a visual barrier. However, paint is not permanent and is easily omitted during construction or retrofit. Therefore, the request is denied.

2. *Windows and transoms.* The Flat Glass Marketing Association (FGMA) stated that there is no economic or empirical justification for excluding windows from the scope of a standard and yet, including those windows and transoms which are close enough to a door to come within the definition of a glazed panel as contained in § 1201.2(a)(10) of the standard.

Only when a window falls within the definition of a glazed panel does it come within the scope of the standard. The risks of injury associated with glazed panels include lacerations, contusions, abrasions, and other injuries and death resulting from walking or running into glazed panels mistaken as a means of ingress or egress, pushing against glazed panels in an attempt to open a door (e.g., when distracted while intending to open a door), or accidentally falling into or through glazed panels. The risks of injury from windows in general are lacerations, contusions, abrasions and other injuries and death resulting from falling against, opening, closing, washing or otherwise handling windows.

When the window falls within the definition of glazed panel as used in this standard, it is associated with the risks of injury from glazed panels as well as the risks of injury associated with windows in general. The purpose of including such windows in the standard is to address the risks of injury associated with glazed panels and not windows in general. The Commission will continue to encourage further efforts to reduce injuries associated with windows. The Commission will continue to review information available concerning injuries associated with windows and the technological practicability of developing a standard for that product and may, in the future if warranted, initiate a standard development proceeding relative to windows.

The comment on windows from FGMA appears to be based in part on the belief that the Commission intended that transoms be included within the scope of the proposed standard. This was not the Commission's intent. The location of the customary above-the-door transom, usually more than 6 feet above the walking surface, would generally forestall the specified risks of injury associated with architectural glazing materials to which the proposed standard was addressed. In addition, there were no injuries related to transoms discovered in a review of the Commission's investigative reports and a potential for injury does not appear to exist. Thus, a transom whose bottom edge is above the top of the door is not included in the standard. Accordingly, §§ 1201.2(a)(10)(i) and 1201.2(a)(10)(ii) have been revised to clarify that such transoms are excluded from the standard.

3. *Wired glass in fire assemblies.* Comments relative to the treatment to be accorded glazing used in fire doors were submitted by CSGC; Doorlite Producers Association; Flat Glass Association of Japan; Chairman, Committee on Fire Doors and Windows, National Fire Protection Association (NFPA); C–E Glass Co.; and the American Insurance Association. They recommended, in effect, that wired glass used in fire doors be exempt from the provisions of the standard or, in the alternative, be tested at an impact level of 100 foot pounds or less rather than the 150 or 400 foot pounds levels established in § 1201.4(d)(1) of the standard.

For the most part, the glazing used in fire doors is ¼ inch wired glass. Several of the commentors stated, in effect, that virtually every federal, state and muncipal fire code requires the use of wired glass, and that ¼ inch wired glass is the only material currently manufactured that meets the requirements of such fire codes. The commentors stated that such glass cannot now meet the requirements of the standard.

The commentors indicated that the hazards of injury by being struck by a door while it is being opened, or of death, personal injury, and more extensive property damage by handicapping fire fighting, outweigh the types of injury to which the standard is addressed. Presumably they believe that if wired glass for fire doors must comply with the standard, vision panels in fire doors would disappear, resulting in decreased safety to occupants and firefighters during a fire and increased door accidents during routine use of the building.

At the public hearing, a representative of the C–E Glass Co. advanced the proposal that should the Commission continue to believe that wired glass should be included within the scope of the standard, then the industry should be permitted sufficient time to develop the necessary technology for the production of glazing materials for use in fire doors which will meet the requirements of a standard.

The Commission has investigated these comments. It recognizes that wired glass which is intended to retard the passage of fire is often used in high risk locations where there is genuine potential for serious injury from the hazards the standard is designed to prevent. The Commission believes that wired glass intended for use in doors and other assemblies which will both retard the passage of fire and meet this standard can be developed. However, the Commission does not have sufficient information to determine whether wired glass intended to retard the passage of fire and which would met Category I impact test requirements (specified in § 1201.4(d)) is available at this time. Consequently, for the reasons advanced by the commentors, the Commission has decided for good cause and in the public interest and safety to defer for 2½ years from the effective date of the standard the effective date of the standard as to wired glass used in doors or other assemblies subject to this Part 1201 and used to retard the passage of fire, when such wired glass is required by federal, state, local or municipal fire ordinance. A deferred effective date of 2½ years from the overall effective date has been established in order to allow a period of time for the technological development of such materials, and additional time for fire codes to be amended in order that glazing materials meeting the requirements of both the fire codes for retarding the passage of fire and Category I of this standard might be readily manufactured and marketed. This deferred effective date is reflected in §§ 1201.1(c)(1) and 1201.7 of the final standard.

Furthermore, the Commission has made a revision in the standard which should further assist in meeting the requirements of both fire codes and the standard. In the proposed standard, § 1201.2(a)(3) and (4) established the dividing line between Category I and Category II doors, storm doors, and glazed panels at 6 square feet. Thus, depending on the size of the glazing material some products covered by this standard and required to retard the passage of fire would have been required to use glazing material meeting Category I requirements, whereas others would have been required to use glazing material meeting the more stringent Category II impact requirements (see § 1201.4(d)(1)). For reasons which are more fully discussed in section III(B) of this preamble, the dividing line between Category I and Category II doors, storm doors and glazed panels has been revised from 6 to 9 square feet. As a result of this

change, fire doors, as defined by the National Fire Protection Association standard for firedoors and windows (NFPA 80–1975), would fall within Category I requirements which are less stringent than Category II requirements. The Commission believes that these changes continue to provide protection to the public because there is little, if any, likelihood for full body impact with glazing material in doors and other assemblies intended to retard the passage of fire, which is the hazard the impact levels of Category II are intended to address.

4. *Louvers of jalousie doors.* The Exterior Home Products Manufacturers Association, Karey Products Corporation, and The Perfect-Seal and Louvre-Seal Corporations have requested an exemption from the standard for the louvers of jalousie doors.

The operating louvers or vents in a jalousie door are generally made of annealed glass. Each louver is one of a series of overlapping pieces of glazing material designed to admit ventilation and light but exclude rain. The louvers have rounded edges which when opened point outward toward anyone approaching the door. When closed, the louvers overlap one another. The louvers are operated by a crank and gear mechanism located on one side of the door, and proper closing of one louver against the other to ensure a weather tight seal is dependent upon the louvers being rigid and perfectly flat.

Annealed glass appears to be uniquely suited for use in the louvers of jalousie doors. There is some question whether tempered glass can be used in louvers due to the possibility that such glass may warp when employed in sizes used in louvers. The use of laminated glass, whose edges allegedly cannot be polished, could result in sharp and potentially hazardous edges. The use of laminated glass may also meet with a good deal of consumer resistance because the exposed interlayer might be thought by many to be esthetically unsightly. It is also probable that organic-coated glass would be unsuited to this form of usage because the adhesive bond would be exposed to the weather creating the possibility of delamination. The practicability of mandating the use of plastics is undermined by the fact that plastics tend to lose visual clarity over a period of time through clouding or scratching. Some plastics also appear to be too flexible for louver use.

The Commission estimates from its surveillance information that 226 injuries associated with jalousie glass doors were treated in all hospital emergency rooms during 1975. There have been three in-depth investigations involving this product. Two of the injuries resulted from contact with the rough edge of the louver, while the third injury involved a person who punched the glass in anger and broke it.

Further, the Exterior Home Products Manufacturers Association has estimated that to require jalousie doors to meet the requirements of the standard would increase the cost of the product by 25 percent to 30 percent, a figure which the Commission believes is reasonably accurate based upon its own economic analysis. In view of this information, the Commission has determined to exempt the louvers of jalousie doors from the requirements of the standard. Accordingly, § 1201.1(c)(2) of the standard reflects this exemption. In addition, the Commission has added a definition of jalousie door at § 1201.2(a)(12).

5. *Exemptions for glazing materials in small openings.* a. PPG Industries has requested an exemption from the standard for glazing materials used in openings in doors through which a 3-inch diameter sphere is unable to pass. PPG contends that a piece of glazing material this narrow could not possibly fail the impact test requirements of the standard (see § 1201.4(e)(1)(i)).

The Commission agrees in principle that there are certain size openings in doors in which glazing materials are unlikely to present the hazards identified because it is unlikely that any part of a consumer's body is likely to impact such a small opening or, if it does, is unlikely to pass into such an opening. Therefore, the Commission has determined to permit the exemption as requested. Accordingly, § 1201.1(c)(3) of the standard has been added to reflect this exemption.

b. Exterior Home Products Manufacturers Association requested an exemption for vertical lites or strips which are 6 inches or less in width and are used as decorative strips in high fashion jalousie doors.

The Commission believes that openings in doors through which a 3 inch diameter sphere can pass present the injury potential which the standard has been designed to reduce or eliminate. Accordingly, this specific request for exemption is denied. However, as previously indicated, the Commission has granted exemptions for louvers in jalousie doors and for any openings in a door through which a 3 inch diameter sphere cannot pass.

6. *Commercial refrigerated cabinet doors.* Comments by Anthony's Manufacturing Company, Inc. recommend that the proposed standard include within the scope of its coverage glass doors of commercial refrigerated cabinets, typically used by consumers in food stores.

The definition of glazed panel contained in § 1201.2(a)(10)(iii) of the standard, if read literally, could be interpreted to include these products when the doors are open. However, it was not the intent of the Commission to include such products within the scope of the standard. Therefore with that fact in mind and since the Commission is unaware of any injury information as to these products, the Commission has determined to exempt commercial refrigerated cabinet glass doors from the scope of the standard at this time. Accordingly, § 1201.1(c)(6) reflects this exemption.

7. *Garage doors.* One commentor, Phenix Manufacturing Company, requested a clarification of § 1201.2(a)(7), which defines doors, as to whether glazing materials used in garage doors designed for vehicular passage are included in the scope of the standard.

The Commission intends that § 1201.2(a)(7) apply only to doors designed for human passage and therefore does not apply to garage doors designed for vehicular passage. However, glazing materials in doors of garages which are designed solely for human passage are included in the scope of Part 1201, since such doors are associated with the same types of injury as other doors designed for human passage. The Commission believes these explanations are clear in this standard and therefore has not changed the text as requested.

8. *Specialty products.* a. PPG Industries commented that certain specialty products, such as bullet resistant glazing, would be covered by the standard, but are consistently overdesigned when compared with the impact test criteria. For example, bullet resistant glazing is presumably so thick that it will consistently pass the impact test criteria.

PPG recommended that § 1201.4(a)(3) be amended to exempt these products from certain tests if it can be demonstrated that the product is overdesigned for the characteristic in question.

As stated earlier in the preamble, any obligation of a manufacturer to test glazing materials subject to the standard is created by provisions of section 14 of the Consumer Product Safety Act and any regulations thereunder prescribing a reasonable testing program which the Commission may issue. The Commission has stated its intention to begin a separate rulemaking proceeding to issue regulations governing reasonable testing programs for architectural glazing materials subject to the standard. Provisions to exempt materials from some or all of the requirements for testing, or to limit the amount of testing, will be addressed in a regulation governing testing programs when it is published for public comment.

b. A representative of The Association of Motion Picture and Television Producers, Inc. asked whether an exemption is being made for break-away glass in the making of motion pictures where such glass is needed in connection with the filming of motion picture stories.

Such glazing materials do not appear to be produced or distributed for sale to or for use or enjoyment of consumers, but are used only by employees of motion picture producers. Therefore, such products do not appear to be consumer products and would not be covered by the standard.

9. *Curved glazed panels of revolving doors.* One commentor, the Crane Fulview Glass Door Company, inquired whether the Commission intended to include within the scope of the standard the curved sidelights (glazed panels—see § 1201.2(a)(10)) of revolving doors.

The Commission does not have any injury information associated with the curved sidelights of revolving doors. It also recognizes that there is less likely to be a potential for injury from these items than with other sidelights by vir-

tue of the design of revolving door assemblies.

The Commission also has conflicting information as to whether the use of laminated and tempered glazing are technologically feasible in the curved sidelights of revolving doors. Available information indicates that the use of thick annealed glass would be costly and that the use of plastic glazing may present scratching and clouding problems. Finally, the specific test procedure set out in § 1201.4 would have to be adapted before it could be used with these curved glazing materials.

In view of the foregoing, the Commission is exempting curved sidelights of revolving doors from coverage of the standard. This exemption is set out in § 1201.1(c)(5). If the Commission obtains information indicating that an unreasonable risk of injury exists with respect to these curved sidelights, the Commission will consider amending the standard by repealing the exemption and, if necessary, revising the test procedure to accommodate such materials.

10. *Leaded glass.* Visador, a manufacturer of decorative leaded glass, requested a limited exception under suggested conditions for this product. Doorlite Producers Association requested a complete exemption for this product.

Leaded glass is a composite glazing panel composed of relatively small pieces of glass, the individual pieces being supported by lead or zinc bars. When used, it is used primarily as glazing material in doors and glazed panels of residential dwellings. Leaded glass is a specialized, rather expensive product used for its esthetic qualities. As a result, it is used infrequently. Because of the infrequent use of the product in locations addressed by the standard, it is difficult to assess the degree of the risk of injury associated with this product.

Visador has suggested that leaded glass be excluded from the scope of the standard when the individual panels are no greater than thirty square inches, and the total leaded glass area is no greater than 6 square feet. The 6 square feet limit was requested, in part, to be consistent with the Commission's dividing line between Category I and Category II doors and glazed panels included in the proposed standard (see proposed § 1201.2(a) (3) and (4)).

The Commission recognizes that inclusion of leaded glass within the scope of the standard would result in a reduction in its esthetic qualities, and loss of consumer utility. The Commission is also aware that leaded glass is a speciality product and represents an extremely small part of the total market for glazing materials.

Therefore, the Commission has determined to exclude leaded glass from the requirements of the standard when no individual panel of glass is greater than thirty square inches. The Commission has also concluded that no restriction is necessary for the total leaded glass area. Accordingly, § 1201.1(c)(4) has been added to reflect this exemption.

11. *Glazing materials in boats.* An interested individual recommended that glazing materials used in boats should be required to comply with the standard.

Section 3(a)(1)(G) of the CPSA (15 U.S.C. 2052(a)(1)(G)) excludes from the CPSC's jurisdiction boats which could be subject to safety regulation under the Federal Boat Safety Act. Since glazing materials on boats could be subject to such regulation, the Commission has no authority to require that glazing material used in boats comply with the Commission's standard.

12. *Residential greenhouses and storm windows.* The Plastic Safety Glazing Committee and Rohm and Haas Company requested that residential greenhouses and removable storm windows be included within the scope of the standard.

To the extent that doors of greenhouses and glazed panels fall within the definition of doors and glazed panels in § 1201.2(a) (7) and (10), they would be subject to the standard. The requirements of the standard would not apply, per se, to other portions of greenhouses. This principle would apply to all greenhouses used by consumers.

Removable storm windows are considered by the Commission to be windows. Windows in general are not included within the scope of the standard for reasons detailed in the preamble to the proposed standard (41 FR 6178, February 11, 1976).

13. *Glazing materials in mobile homes and motor homes.* a. The Skyline Corporation and the Flat Glass Marketers Association submitted a recommendation that the standard should expressly exclude glazing materials used in mobile homes.

The Commission has concurrent jurisdiction with the Department of Housing and Urban Development (HUD) over consumer products used in or around mobile homes as that term is defined in the Mobile Home Construction and Safety Standards Act (Mobile Home Act). Pursuant to that act, HUD has issued construction and safety standards for mobile homes which, in part, include requirements for the use of safety glazing materials in windows and sliding glass doors, unbacked mirrored wardrobe doors, shower and bathtub enclosures and surrounds to a height of 6 feet above the bathroom floor level, storm doors or combination doors, and in panels located within 12 inches on either side of exit or entrance doors (24 CFR 200.114, 40 FR 50757). In order to avoid a conflict between HUD's standards and the Commission's standard, the Commission has, as a matter of policy, determined not to apply this standard to architectural glazing material used in the architectural products identified in § 1201.1(a) of the standard when the products are used in mobile homes. Section 1201.1(b) of the standard has been changed, accordingly.

b. PPG Industries commented that the definition of mobile home appears to include motor homes and that such vehicles should be under the jurisdiction of the National Highway Traffic Safety Administration and not the Commission.

Section 3(a)(1)(C) of the Consumer Product Safety Act (15 U.S.C. 2052(a)(1)(C)) excludes from the Commission's jurisdiction motor vehicles and motor vehicle equipment as defined by the National Traffic and Motor Vehicle Safety Act. To the extent that glazing materials used in motor homes would be motor vehicle equipment, they would not be included within the scope of the Commission's standard. No additional amendment to the standard is necessary to indicate this lack of authority.

14. *Laminated glass.* Representatives of manufacturers of laminated glass have objected to provisions of the standard which they believe adversely affect them. The Glass Tempering Association and the Ford Motor Company have suggested that there are no recorded instances of injury from the use of laminated glass, and that more severe test procedures than those recommended by CSGC are not warranted. Ford, Buchmin Industries, Globe Amerada Glass Company, Libbey-Owens Ford Company, and the Glass Laminators Committee have claimed that laminated glass should not be subject to the 400 foot pound impact test level set out in § 1201.4(d)(1). All have claimed that there would be a serious economic effect, primarily on competition between laminated glass and its competitors, by mandating the standard as proposed, and that this effect is unwarranted in view of the safety record of laminated glass.

Three remedies have been suggested by these commentors. These are: (1) A return to the test procedure recommended by CSGC which provides for incremental levels of impact and usually has the effect of subjecting laminated glass to no more than 150 foot pounds of kinetic energy, (2) testing laminated glass at one level intermediate between 150 foot pounds and 400 foot pounds rather than at 400 foot pounds, or (3) modifying the definitions of Category I and Category II (§ 1201.2(a) (3) and (4)) so that the dividing line for glazing materials used in doors, storm doors, and glazed panels is 18 square feet rather than 6 square feet.

The Commission acknowledges that laminated glass is safer than annealed glass. However, for the reasons discussed in section III(C)(1)(a) of this preamble, the Commission believes that 400 foot pounds is a foreseeable kinetic energy of human impact for glazing material, including laminated glass, where there is a possibility of full body impact. Failure of products used in such locations to withstand impacts or break acceptably at 400 foot pounds could result in those injuries which the standard is designed to reduce or eliminate. A possible explanation for the lack of injury data associated with laminated glass is that laminated glass has not been used to the same extent as annealed glass so that exposure to injury from laminated glass is less.

The Commission's economic analysis indicates that the competitive impact of the proposed changes would not severely weaken the position of laminated glass in the market place. (See Economic Con-

siderations, Part III(D) of this preamble). This analysis indicates that there will be a price increase which will be borne by consumers but that the increase will be minor. Despite the increase, the Commission continues to believe that glazing materials should withstand impacts or break acceptably at levels of kinetic energy which are foreseeable in the event of human impact.

The Commission does not agree with the suggestion that the demarcation for glazing materials in Category I and Category II doors, storm doors, and glazed panels be changed from 6 square feet to 18 square feet. This change would have the effect of putting most, if not all, doors and glazed panels for residential uses in Category I and would fail to subject some sizes of glazing materials that are large enough for full body impacts to kinetic energy levels which are foreseeable. However, for reasons discussed in section III(B), "Distinction Between Category I and Category II," of this preamble, the dividing line will now be set at 9 square feet. (See § 1201.2(a) (3) and (4).)

15. *Organic-coated glass.* a. One manufacturer of organic-coated glass, Break-Safe Glass, and one manufacturer of the film used to make organic-coated glass, the 3M Company, have objected to provisions of the proposed standard which they believe adversely affect them. They have stated that there are no injuries from the use of organic-coated glass; that the product has more utility than its principal competitor (plastics) because of the scratch resistance provided by organic coated glass on one side; and that, a dividing line for glazing materials in Category I and Category II doors, storm doors, and glazed panels at six square feet so restricts their potential market that they could not continue to sell the product because it could not meet the test criteria for impact of Category II products (see § 1201.4(d) (1)). They recommended that the dividing line between Category I and II (§ 1201.2(a) (3) and (4)) be set at 18 square feet to allow most products to use glazing materials tested at 150 foot pounds.

The Commission acknowledges that organic-coated glass is safer than annealed glass. However, for the reasons discussed in section III(C) (1) (a) of the preamble, the Commission believes that 400 foot pounds is a foreseeable kinetic energy of human impact for glazing materials where there is a possibility of full body impact. Failure of products used in such locations to withstand impacts of or break acceptably at 400 foot pounds could result in those injuries which the standard is designed to reduce or eliminate.

A possible explanation for the lack of injury data associated with organic-coated glass is that organic-coated glass is a new product with relatively few sales. Thus, there has not been significant use information to evaluate the risk of injury based on injury statistics alone. However, for the reasons set forth in the preamble discussion on laminated glass in section III(A) (14) and in section III(B) below, entitled "Distinction Between Category I and Category II", the Commission declines to set the dividing line between Category I and Category II at 18 square feet but has instead set it at 9 square feet.

The Commission's economic analysis of the standard's effect upon organic-coated glass is discussed in section D of the preamble, entitled "Economic Considerations."

b. PPG Industries commented that the definition for organic-coated glass, proposed at § 1201.2(a) (18), permits organic-coated glass to have a polymeric coating on both sides of the glass but that the accelerated environmental durability tests, proposed at § 1201.4(d) (2) (ii), and the labeling provision which directs the orientation of the material on the product, proposed at § 1201.5(c), only permit use of glazing materials that have the coating on one side. It suggests that the Commission resolve this ambiguity.

The intent of the definition for organic-coated glass, now set out at § 1201.2(a) (20), is to include within its scope glass that has a polymeric coating on one or both sides. The intent of proposed § 1201.4(d) (2) (ii) and proposed § 1201.5(c) is to ensure that glass which has a polymeric coating on one side only, with an adhesive-coating system intended to be oriented to the inside of a building, is tested with that surface away from the radiant source of energy and labeled accordingly.

However, it was not intended that glass having a polymeric coating on both sides, or glass having an organic coating on one side and that is resistant on that side to outdoor weathering, be restricted to inside orientation. Accordingly, § 1201.4(c) (3) (ii) on test specimens, § 1201.4(d) (2) (ii) on test procedures, and § 1201.4(c) (2) (ii) have been revised to allow for testing under either condition. Section 1201.5(c) continues to prescribe labeling requirements for organic-coated glass that has been tested for environmental exposure from one side only.

16. *Windblown missiles and wind induced blowouts.* A professor at Villanova University commented that the standard should include requirements for hazards associated with the impact of windblown missiles and with wind induced blowouts of wall panels.

Such hazards were not included in the risks of injury cited in the notice of proceeding or in the proposed standard. The Commission also has no injury information associated with these hazards. Accordingly, the request is denied.

B. *Distinction between Category I and Category II.* Several comments were made recommending an upward revision of the 6 square foot division point for glazing materials in Category I and Category II doors, storm doors and glazed panels (§ 1201.2(a) (3) and (4)). Representatives of manufacturers of laminated glass and organic-coated glass suggested a division point of 18 square feet.

The proposed standard divided products containing architectural glazing materials into two categories for impact test purposes depending in part upon the area of the individual pieces of glazing used. The division point was established at 6 square feet. Section 1201.2(a) (3) of the proposal defines Category I doors, storm doors, and glazed panels as those in which no piece of glazing material is greater than 6 square feet in surface area, and § 1201.2(a) (4) defines Category II doors, storm doors, and glazed panels as those in which any piece of glazing material is greater than 6 square feet in surface area. Section 1201.4(d) (1) requires that glazing materials used in Category I products meet the criteria of the standard when tested at 150 foot pounds, while glazing materials used in Category II products must meet the criteria when tested at 400 foot pounds. These impact requirements are designed to ensure that glazing materials for each of the two categories will not break or will break with characteristics less likely than other glazing materials to cause an unreasonable risk of injury.

After careful consideration of the comments received in the public record, engineering and medical sources, and information provided by its staff, the Commission has determined that the proposed division point of 6 square feet is unnecessarily restrictive. Consequently, the definitions of Category I and Category II doors, storm doors, and glazed panels have been revised. The two categories of products are intended to differentiate products where there is a potential for full body impact from those products where there is not such a potential. In order to have full body impact, an individual must be able to fit through an opening without contacting any portion of the supporting frame or the frame will absorb an unknown amount of the total energy. The age group most frequently injured in accidents associated with architectural glazing materials is children under the age of 15. In the judgment of the Commission, children aged 11 years and older appear to be able to generate 400 foot pounds of kinetic energy and could deliver a full body impact to glazed panels of 9 square feet or greater. Therefore, it is estimated that in an accident situation such children could impact a panel larger than 9 square feet with a kinetic energy greater than 150 foot pounds.

Moreover, many products containing glazing materials in pieces which are 9 square feet or less usually have the glazing material located so that full body impact is not likely to occur. For instance, in storm doors incorporating one large panel of glazing material over most of the area of the door, and in which full body impact is probable, the glazing material is in excess of 9 square feet. In storm doors containing one smaller panel of glazing material, that glazing material is generally located in the upper half of the door. Where 2 or more small panels are used, the area of each piece is less than 9 square feet and each piece is utilized in such a manner so as to make full body impact with either piece unlikely.

Therefore, the Commission believes that a 9 square foot division point between Category I and Category II doors, storm doors, and glazed panels is reasonable. Section 1201.2(a) (3) now defines Category I doors, storm doors, and glazed panels as those in which no single piece of glazing material is greater than 9 square feet in surface area, and § 1201.2 (a) (4) now defines Category II doors, storm doors, and glazed panels as those in which any piece of glazing material is greater than 9 square feet in surface area.

C. *Test procedures.* Many of the written comments and a good deal of the oral testimony dealt with the test procedures contained in § 1201.4 of the proposed standard.

1. *Impact test procedures.* Eleven substantive written comments relate to the impact testing procedures of § 1201.4(d) (1) of the proposed rule. The transcript of the oral testimony also contains significant testimony on this matter. The commentors were Associated Laboratories, Inc.; CSGC; Associated Certification, Inc.; Glass Tempering Association; Flat Glass Marketing Association; PPG Industries; Fourco Glass Company; Libby-Owens-Ford Company; International Conference of Building Officials; Glass Laminators Committee; C. E. Glass Company; 3M Company; and the Globe Glass and Trim Company.

a. *Impact kinetic energies.* 1. A number of commentors requested the use of the incremental impact test procedure of the offeror's recommended standard, which provides for a test specimen of glazing material to be impacted at increasingly higher kinetic energies until breakage occurs or the specimen fails to break from a 48 inch drop height (400 foot pounds of kinetic energy). This incremental loading procedure does not check break patterns above the lowest drop height from which breakage occurs, and therefore the Commission believes it to be deficient.

The Commission is of the opinion that the incremental loading procedure also has the anomalous effect of passing materials which break acceptably at a lower energy yet failing others which do not even break at that lower energy but break unacceptably at a higher energy level. Accordingly, the Commission still approves of the procedure of the proposed standard, which abandons the incremental loading procedure, and instead provides a more performance oriented impact procedure which divides products into two categories according to the expectation of high energy or low energy impacts. In view of the foregoing, an impact test procedure based on two categories has been retained in the final standard at § 1201.4(d) (1).

2. One commentor argued that materials that pass the impact test level for Category II should not also be required to be tested at the impact test level for Category I in order to be used in Category I products. Others stated that impact testing should be required at both levels if the glazing material is to be certified at both levels.

The Commission is unaware of any instance in which glazing materials that pass the Category II requirements would not also be adequate for Category I requirements. Therefore, it has concluded that materials that pass the impact test requirements for Category II may be used in either Category I or Category II applications. Glazing materials intended solely for use in Category I applications must continue to be tested in accordance with the impact test procedure for Category I. Accordingly, § 1201.4 (e) (1) has been revised to reflect this alteration in the test procedure.

3. Several commentors stated that it is unnecessarily restrictive and unjustifiable to require glazing materials used in Category I and Category II products to meet the impact test drop heights in the proposed standard of 18 inches (150 foot pounds kinetic energy) and 48 inches, (400 foot pounds kinetic energy) respectively. Although these two drop heights were used in the impact test procedure recommended to the Commission by the offeror, they were used only if a material failed to break at a lower drop height of 12 inches. In the proposed standard, the 18 inch drop height is mandated for Category I products, resulting in a kinetic energy of 150 foot pounds at impact. The 48 inch drop height is mandated for Category II products, resulting in a kinetic energy at impact of 400 foot pounds.

When the Commission evaluated the recommended standard submitted to it by the offeror, it recognized that materials should not be accepted by tests based on unrepresentative energy levels. It further recognized that glazing materials used in products in such a manner that full body impacts are reasonably foreseeable should be tested at higher energy levels than glazing materials used in products where reasonably foreseeable impacts would tend to be at lower energy levels and generally confined to less than full body impacts.

Because the Commission had not conducted experiments of its own to determine appropriate levels of test impact energy, the Commission used data from the offeror, the National Center for Health Statistics, and from CPSC studies of football players to calculate probable ranges of expected energy levels for full body and less than full body impacts. The results of these calculations were then compared to the three energy levels of 100, 150 and 400 foot pounds found in the standard recommended by the CSGC to determine if any or all of them were appropriate. (Engineering Report, Bureau of Engineering Sciences, August 20, 1975). The Commission also reviewed information contained in the voluntary standard ANSI Z97.1–1975, "Performance Specifications and Methods of Tests for Safety Glazing Material Used in Buildings," September 26, 1975; information contained in the Testing and Standards Subcommittee Report submitted by CSGC; and calculations submitted by CSGC regarding energy levels of the impact test and energy levels involved in accidental human contact with glazing. (ANSI standards are approved and published by the American National Standards Institute, Inc., 1430 Broadway, New York, N.Y. 10018.)

Expected maximum velocity and mean weight, broken down by age group, were determined from the information supplied by the aforementioned sources. From this procedure, it was estimated that kinetic energies that could be generated ranged from 59 foot pounds for children under five years old to 1503 foot pounds for a running male football player. These energy levels were than adjusted using factors suggested by CSGC to estimate the kinetic energies likely to be generated by various body parts in different impact situations.

The results of the estimates, which as indicated in the preamble to the proposal are available for review by the public, showed that the 400 foot pound energy level (corresponding to the 48 inch drop height) could offer protection to most adult males for lower extremity, torso and arm contact and thus those in other age groups as well. The Commission therefore considered a 400 foot pound test requirement to be in an appropriate range of values to protect consumers against injuries due to full body impact.

For smaller glazing applications, the estimates showed that the 100 foot pound energy level (corresponding to the 12 inch drop height) of the CSGC's recommended standard would protect only the age group below five years old. On the other hand, the 150 foot pound energy level (corresponding to the 18 inch drop height) appears to offer protection for hand and arm impacts to adults and protection to children below 10 years old for whole body impacts. Thus, a more appropriate level for Category I appears to be 150 foot pounds. For this reason, the Commission has chosen the 150 foot pound energy level for Category I products instead of the 100 foot pound level. Section 1201.4(d) (1) of the standard has therefore not been changed in this regard.

4. 3M stated that the proposed test levels in § 1201.4(d) (1) appear to be inconsistent with CSGC test results. To determine if the proposed test levels are inconsistent with the CSGC test results, it is necessary to consider the test procedures used by CSGC. CSGC asked human volunteers to walk and run into panels which were instrumented to measure the energy absorbed by the panel when impacted by the subject. While this testing suggested the glazing materials when impacted absorbed energies lower than 400 foot pounds, the Commission believes that to ask volunteers to incur full body, full speed impacts, where the potential for harm appears so real, may result in test impacts of lower values than occur in actual accidental situations. Therefore, the Commission disagrees with the observation of 3M.

5. Several commentors objected to the concept in the proposed standard of two categories of products for which the glazing materials must meet different impact test levels. The Commission believes

it is meaningful to provide different tests for products that will be foreseeably subject to full body impact and those subject to less than full body impact because:

a. the prescribed test impacts are reasonably related to foreseeable human impacts, as discussed above, and;

b. the alternatives to the use of such categories at this time would appear to be either a return to the deficient incremental loading concept recommended by CSGC (discussed above); or imposition of uniform test requirements which are unnecessarily strict and would eliminate some safety glazing materials; or evaluation of breakage at a series of energy levels, which would cause an undue test burden.

After due consideration, the Commission determined to retain in § 1201.2(a) (3) and (4) of the final standard two categories with different impact test requirements for each category (§ 1201.4 (d)(1)), and a revised dividing line of 9 square feet.

b. *Impactor. 1.* Sears, Roebuck and Co. commented with regard to the impactor that glass will break at different kinetic energies depending upon the size and shape of the impactor, its velocity, and other characteristics of the impact. The Commission agrees with the comment. Glass breakage is typically a phenomenon which originates at the surface, and an impactor that is smaller or harder than the impactor prescribed in § 1201.4 (b)(2) of the standard will be able to raise higher surface stresses at the same kinetic energy. Similarly, various parts of the body impart differing types of impacts to glazing material.

Both CSGC and the Commission were aware of problems of matching a single impactor to several different body parts that could impact glazing materials. This anomaly will arise with any impactor chosen, and the Commission has not seen any persuasive specific data indicating that §§ 1201.4(b)(2) or 1201.4(d)(1) should be revised.

2. Another commentor, PPG Industries, suggested that the 4 ounce (0.11 kilograms) weight tolerance for the 100 pound impactor contained in § 1201.4(b)(2)(i) be increased to one pound, because PPG contends it is difficult to construct an impactor with the weight tolerance specified in the proposal. However, because this impactor is tightly filled with lead shot, the possibility arises that a fairly small decrease in the amount of shot would work a significant change in the impact absorbing characteristics of the impactor, thereby adding another variable to the test method. The weight tolerance specified in § 1201.4 (b)(2)(i) can be achieved by persons testing under the standard and, in fact, has an established and recognized history. Therefore, the Commission has retained it in the standard.

3. The Glass Laminators Committee commented that secondary impacts caused by the punching bag impactor can occur. The Commission is of the opinion that secondary impacts can be controlled, for example, by means of a tie line in connection with a cam cleat or a jam cleat.

2. *Interpretation of impact test results*—a. *Three inch hole test. 1.* CSGC, PPG Industries, 3M Company, Libby-Owens-Ford Company, Glass Laminators Committee, and Globe Glass and Trim Company commented in regard to the provision in § 1201.4(e)(1)(i)(A) of the proposal (§ 1201.4(e)(1)(i) of the final standard), regarding one criterion for interpreting results of the impact tests. They stated that moving the broken glazing to a horizontal position in order to measure whether a 3 inch sphere will pass through might induce additional breakage not related to the punching bag impact or to impact conditions in real life, but related only to the weight of the glazing.

The Commission's intent in requiring the impacted glazing to be moved to a horizontal position is to deal with an inadequacy in CSGC's recommended test procedure for the 3 inch hole criterion which allowed specimens to pass if a shard of glazing material remains dangling in the opening. In such a case, the specimen would have passed because geometrically there is not a 3 inch hole, despite the fact that the specimen still presents an unacceptable hazard. The procedure in § 1201.4 (e) (i) requires turning the broken specimen horizontally so that such a shard will fall through, exposing the hole.

Another intent of the horizontal measurement is to address the situation where the material opens wide during impact (thus presenting the hazard of exposing limbs to entrapment) but closes to a smaller size before measurement. Furthermore, in an accident situation the victim could foreseeably create a larger opening by secondary contacts with the glazing material, or by momentum from the initial impact. Therefore, some additional breakage is foreseeable, and a procedure which may produce some additional breakage is not unreasonable. To address these two hazards, the Commission believes that the test procedure which causes additional stress on the opening by the force created by the weight of the glazing material in a horizontal position and by placing of a 4 pound ball on the opening is reasonable. Therefore, the Commission has retained the provisions of § 1201.4 (e)(1)(i).

2. Several commentors stated that in the interpretation of results of the impact test (§ 1201.4(e)(1)(i) the standard as worded does not cover the instance in which the edge of organic-coated glass pulls from the frame yet the broken specimen remains completely intact. Tests conducted for the Commission demonstrated that such occurrences can and do happen during testing. If the organic coating and adhesive are so strong that they hold the specimen intact even though it pulls out of the test frame, it is foreseeable that the same would happen even more frequently in architectural uses, where the glazing is less firmly gripped by the framing. In such a case, a person impacting the glazing would not be pierced or lacerated by holes opening in the specimen, which remains intact. In such a situation, the specimen would be acceptable under § 1201.4(e)(1)(i) since this section states: "* * * no opening shall develop *in* the test sample through which (the three-inch diameter sphere may pass)" [Emphasis added]. Therefore, § 1201.4 (e)(1)(i) has not been revised in this regard.

Because the broken specimen may hang limply out of the frame as in the above case, commentors have questioned how the 3 inch diameter sphere criterion of § 1201.4(e)(1)(i) may be applied with the specimen in a horizontal position. Although it is not desirable to handle broken glass, it should be possible to support the edges of the broken specimen in a horizontal position and then set the test sphere on this supported specimen. The Commission would permit this procedure only if the edge of the specimen had actually pulled out of the subframe, because it is only in that case where the edge of the original specimen needs to be supported.

3. A commentor implies that the 3 inch diameter sphere will pass through openings in different materials in different periods of time, and he asks how long the sphere should be left in the opening. The intent of using the sphere is to make a geometric test as is done in the offeror's recommended standard, to push aside any dangling shards, and to address the situation where the glazing material has closed after impact. The sphere may be removed quickly and still satisfy these intents. For the sake of uniformity, the Commission has determined that a time of one second would be technically appropriate. Section 1201.4(e)(1)(i) has been revised accordingly.

b. *Modulus of elasticity and hardness. 1.* Comments on § 1201.4(e)(1)(i)(C) of the proposal (§ 1201.4(e)(1)(iii) of the final standard), relative to the hardness and modulus of elasticity of plastic glazing materials, were received from the Plastic Safety Glazing Committee, representing the domestic plastic industry; Rohm and Haas Company and Dow Chemical Co., manufacturers of plastic glazing materials; and Associated Laboratories, Inc. Two of these organizations also made oral presentations at the public hearing. Several of these comments requested different tests for modulus of elasticity (stiffness) and hardness from those specified in the proposed standard.

For the purposes of determining whether plastic glazing materials meet necessary stiffness and hardness values, the Commission has determined that the proposed tests shall be included in the final standard, rather than the other tests which the comments recommended. The tests which were proposed have an established and recognized history and the public record contains no arguments persuasive to the Commission as to why they should be revised or eliminated.

Section 14 of the CPSA regarding certification, rather than the standard, imposes obligations on manufacturers to test products subject to the standard. The Commission plans to issue regula-

tions under section 14 governing reasonable testing programs for certification of compliance with the standard. The Commission will in that proceeding consider the possibility of permitting stiffness and hardness tests for purposes of certification other than those currently set forth in § 1201.4(e)(1)(iii) of the final rule. Nevertheless, the Commission will employ the stiffness and hardness tests specified in the standard in its compliance program.

2. Rohm and Haas Company recommended that the first line of proposed § 1201.4(e)(1)(i)(C) be revised to specify that plastic glazing materials must actually be impacted.

In view of the fact that the proposed criteria for plastic glazing materials do not contain performance specifications, the Commission is of the opinion that there is no technical reason to require that plastics actually be impacted since the proposed criteria are measurements of stiffness and hardness, which can be measured independently of an impact test and would not be altered by an impact test. The Commission therefore has determined that the criteria in the final standard, now set out as § 1201.4(e)(1)(iii), should not be changed. For clarity, the Commission has indicated at § 1201.4(d)(1) that such specimens need not be impacted.

3. Associated Laboratories suggested that the allowable modulus of elasticity and hardness readings be raised by 33 percent. The comment states that this change would include all known plastics. (The proposed levels, so far as is known to the Commission, allow all presently used glazing plastics to pass the impact test. The suggested change would allow all plastics to pass the test.)

In the absence of empirical or experimental correlations between the two suggested measurements and safety, the Commission believes that the suggested revision should not be made. For a given thickness of material, such a revision would result in passing plastics of lesser impact resistance than would pass under the standard as proposed. If such plastics were marketed and used as glazing materials in the products covered by the standard, they could be involved in a statistically higher number of breakages, which marginally would increase the risks associated with these products. Moreover, no manufacturer of plastics has furnished information to the Commission indicating that a product will be adversely affected by the modulus of elasticity and hardness criteria as proposed and now included in the final standard at § 1201.4(e)(1)(iii).

c. *Criterion for 10 largest pieces.* The criterion contained in proposed § 1201.4(e)(1)(i)(B) was the subject of comments by Associated Laboratories, Inc. and Associated Certification, Inc. That section provides that specimens pass the impact test when the 10 largest crackfree particles selected within five minutes after the test weigh no more than a certain amount.

1. Associated Laboratories suggested substituting a shape factor for the proposed criterion. Associated Certification suggested shortening the time allowed to search for and weigh the 10 largest pieces and cushioning hard surfaces behind and below the test frame upon which the broken pieces impact.

After careful consideration, the Commission determined not to make these recommended revisions. The test as proposed has an established and recognized history as part of the voluntary standards and appears to have served well over the years. The Commission considers the test procedure included in the final standard at § 1201.4(e)(1)(ii) satisfactory to eliminate or reduce the risks of injury associated with glazing materials. The recommended revisions would make the test more stringent than the proposal, a development for which the Commission sees no compellingly persuasive reason.

2. Associated Certification, Inc. reported having seen a large number of poorly tempered specimens break into large pieces having cracks which terminate within the shard. Such cracks have prevented the particle from being a "crack free particle" within the meaning of the proposed criterion, as a result of which the particle is not used for determining whether the specimen passes or fails the test.

Results of tests conducted by the Commission corroborate the commentor's statements, and the Commission has concluded that use of the term "crack free" in the proposed test may actually favor poorly tempered glass over well-tempered glass. Consequently, the term "crack free" has been excised from the final standard and an additional sentence containing a definition of "particle" has been added to § 1201.4(e)(1)(ii) to clarify that a poorly tempered piece of glass which has a crack terminating within the shard is to be considered for inclusion as one of the 10 largest pieces, and to indicate that a network of granules is not considered a "particle" but is instead a grouping of many particles.

d. *Included angle criterion.* In the preamble to the proposed standard, the Commission solicited comment on a staff developed provision that plastics be impacted and pieces no longer than 2 inches remaining in the frame after the impact test be no sharper than 60 degrees (an included angle requirement). The Commission received a number of comments on this subject.

After consideration of the comments received relative to the issue of an included angle criterion, the Commission has determined that most of the issues raised on the proposal concerning this matter are still unresolved. Therefore, the final standard issued below contains no included angle criterion for determining whether a specimen passes the impact test. The Commission is commencing technical studies looking toward the resolution of this matter. If this additional effort leads to development of a criterion which is considered by the Commission to be acceptable either for plastics or for other glazing materials, the Commission may consider amending this standard in accord with the provisions of section 9(e), CPSA, 15 U.S.C. 2058(e).

3. *Environmental durability tests—a. Equipment.* PPG Industries, Atlas Electric Devices Company, and Rohm & Haas Company submitted comments addressed to the environmental durability test equipment specified in § 1201.4(b)(3)(i) and (ii) of the proposed standard.

1. PPG commented upon the equipment for conducting the boil test for laminated glass as specified in § 1201.4(d)(2)(i) of the proposed standard. PPG requested that the first soak required in the boil test be made optional. The request, if granted, would allow the test equipment to be composed of one tank of water instead of two. Under the proposed standard, this equipment consists in part of two tanks of water, one maintained at 150°±5° F (66°±2°C) and the second at a slow boil at atmospheric pressure. (See § 1201.4(b)(3)(i)). The test procedure of the proposed standard specified that the specimens shall first be placed for three minutes in the tank containing the water at 150° F. This is called the first soak. The specimens are then quickly removed and put in the tank containing the boiling water where they experience the second soak for two hours.

The actual test is the second soak. The purpose of the first soak is to provide a transition phase for the test specimens, in the form of an intermediate temperature, so that they are not exposed to severe thermal shock upon being thrust into boiling water directly from room temperatures. By protecting the test specimens from such thermal shock, the test procedure minimizes the likelihood of the glass cracking, which could invalidate that trial and require that the test be repeated.

The purpose of the test procedures in the standard is to specify how the Commission will conduct compliance testing. Omission of the first soak of the boil test would only affect the efficient conduct of such testing due to the increased likelihood of a test specimen's cracking from thermal shock, which in turn would lead to an increase in the number of specimens that must be discarded before an uncracked specimen can be evaluated. Accordingly, the Commission has not modified §§ 1201.4(d)(2)(i) and 1201.4(b)(3)(i) of the standard.

However in the certification regulation to be issued subsequently, the Commission will consider providing that a boil test, which omits the first soak (150° F) specified in the procedure, is the technical equivalent of a boil test when conducted exactly as specified in the standard. This change, if permitted, would allow manufacturers of laminated glass to conduct a reasonable testing program in accord with Section 14 of the CPSA, in which the first soak of the boil test specified in § 1201.4(b)(3)(i) is omitted.

2. Atlas Electric Devices Company made many technical comments concerning the range of test equipment available for accelerated weathering and the proper use of such equipment. Five of these comments were technical state-

ments making no requests or suggestions for change and, therefore, they are not discussed in this document.

Eight of Atlas' comments pertain to the various types and uses of test equipment required by § 1201.4(b)(3)(ii) of the proposed standard for simulated weathering tests. These points were technical in nature and pointed out ambiguities in the description of the test equipment. The Commission has determined that the standard should clearly specify the particular pieces of test equipment to be used by the Commission when it conducts compliance testing using the simulated weathering test or other accelerated weathering tests specified in the standard. The Commission has deleted from the final standard the following sections that appeared in the proposal: 1201.4(b)(3)(iii) (Outdoor weathering test equipment), 1201.4(b)(3)(iv) (Intensified weathering test), and 1201.4(d)(2)(iv) (Identification of plastic and adhesive specimens). In addition, the language of § 1201.4(b)(3)(ii) has been changed by deleting the requirement for use of the carbon arc Weather-Ometer and specifically defining the type of xenon arc Weather-Ometer equipment which the Commission intends to use for compliance purposes in simulated weathering tests. The Commission will expose samples in the xenon arc Weather-Ometer for 1200 hours. This exposure time has been estimated to represent the equivalent ultraviolet exposure of 2000 hours exposure in the carbon arc Weather-Ometer used by many testers and of 375,000 langleys of solar radiation (in the range of two to three years outdoor exposure in Florida). There is underway an interlaboratory testing program sponsored by the American National Standards Institute which may determine and refine these equivalent exposures by measurement. When the study is completed, the Commission may consider amending the exposure requirements for the xenon arc Weather-Ometer. In such a situation, the amendment would be issued in accordance with section 9(e) of the CPA, 15 U.S.C. 2058(e).

3. Rohm and Haas requested that the sentence "Recorders shall monitor the energy reaching the specimens" be deleted from proposed § 1201.4(b)(3)(ii) regarding simulated weathering test equipment. The company states that none of the test apparatus enumerated in that section has provisions for recording the energy reaching the specimens. The Commission believes that the use of the word "recorders" has caused a misunderstanding. The Commission intended to specify a device to either monitor or record the total amount of energy reaching the specimens. The Commission believes that the changes made in the final standard in § 1201.4(b)(3)(ii), based on the comments from Atlas Electric Devices Company, have also addressed the comment by Rohm & Haas. The new wording of this section specifies a piece of commercially available test equipment that has such a monitor.

b. *Test procedures and interpretations of results.* 1. Sears, Roebuck and Co. recommended reducing the strength of the glazing material prior to impact testing through abrasion and scratching. The standard is intended to reduce the unreasonable risks of injury associated with architectural glazing materials by assuring that the glazing materials used in certain architectural products either do not break when impacted with a certain energy, or break with characteristics that are less likely than other glazing materials to present an unreasonable risk of injury. The Commission has no information to indicate that a decrease in the strength of the test specimen, which is brought about by abrasive conditioning of the specimen prior to the impact test, is likely to have an effect on the break pattern or likely to affect the result of the test. Therefore, the Commission declines to modify the standard as recommended.

2. 3M Company requested that the provisions of proposed § 1201.4(d)(2)(iv) regarding plastic specimens be extended to organic-coated glass. As proposed, this section permitted the use of infrared spectra for plastic specimens as a substitute for repeated accelerated environmental durability testing. The tester would attest that there had been no change in the formula of plastic safety glazing materials since material made to the same formula had first been subjected to environmental testing. 3M maintained that the weathering tests are long or expensive or both, and that the infrared spectrum can be used to show that the manufacturer is continuing to use the same plastic and adhesive.

For the reasons noted elsewhere in this preamble, § 1201.4(d)(2)(iv) of the proposal has been deleted from the final standard. However, as previously indicated, the Commission will issue regulations governing reasonable testing programs to support the certification required by section 14 of the CPSA by a separate rulemaking proceeding. Those regulations may allow the use of different test equipment or different test procedures as alternatives to the ones specified in the standard for particular materials under specified conditions.

(3) Associated Laboratories, Inc. and Eastman Chemical Products, Inc. commented in regard to the pass fail criterion set out in § 1201.4(e)(2)(ii)(A) for the accelerated weathering tests for plastics. They question whether permitting a 25 percent decrease in impact strength after weathering, as permitted by § 1201.4(e)(2)(ii)(A)(2), has any effect upon the break characteristics of plastic glazing material or any correlation with safety.

The intent of the pass fail criterion for weathering was to prohibit any significant change in the impact strength of a plastic glazing material after weathering. The Commission believes any change in impact strength of a plastic glazing material after accelerated environmental exposure could indicate that there would be a significant change in mechanical characteristics of that glazing material due to weathering during use. Such long term changes could affect the long term break characteristics of the glazing material, and, therefore, its safety performance characteristics. The permitted decrease of 25 percent is believed to be the maximum decrease in the impact strength that can be permitted in this test without the expectation of a serious decrease in the actual long term impact strength.

4. Both Associated Laboratories and the National Highway Safety Research Center suggested that the Commission substitute the stiffness/hardness criteria of the impact strength test of the proposal (proposed § 1201.4(e)(1)(i)(C), final § 1201.4(e)(1)(iii)) in place of the Charpy type impact strength test used in the environmental durability procedure (§ 1201.4(e)(2)(ii)(A)) both before and after environmental testing.

The Charpy type impact test has an established and recognized history as a standard engineering test method. The public record contains no arguments persuasive to the Commission that the Charpy type test is inappropriate for this standard. Furthermore, as indicated elsewhere in the preamble (Section III (C)(2)(d)), the Commission staff is currently studying alternative requirements to the stiffness/hardness tests as criteria to evaluate the breakage of plastics. Therefore, it appears to be premature to investigate whether the stiffness/hardness criteria should be used elsewhere in the standard. Accordingly, § 1201.4(e)(2)(ii)(A) is issued below without change.

D. *Labeling.* Proposed §§ 1201.5 (b) and (c) prescribed requirements for permanent labeling of certain types of plastic and organic-coated glazing to give information necessary for proper installation or use of those materials. Proposed § 1201.5(d) prohibited the removal of any labeling required by proposed §§ 1201.5 (b) and (c) by anyone other than the ultimate consumer.

1. A comment from the Flat Glass Marketing Association states that there is no economic or empirical justification for prohibiting a fabricator or installer from destroying a permanent label when cutting a sheet of glazing material into smaller pieces, if the smaller pieces are then relabeled. (See proposed § 1201.5(d)).

The purpose of proposed § 1201.5(d) was to assure that all of the information which is required by the standard to appear on a permanent label will reach the ultimate consumer of the glazing material or product containing that material. The text of proposed § 1201.5(d) did not take into consideration the possibility that some glazing materials may be cut to smaller sizes by fabricators and installers before they reach ultimate consumers. Accordingly, proposed § 1201.5(d) has been deleted from the standard issued below. However, requirements for labels required to appear on glazing materials subject to the standard or on products incorporating those materials when those materials or products are

sold to ultimate consumers may, under the authority of section 14(c) of the CPSA, be issued in a separate rulemaking proceeding.

2. The Plastic Safety Glazing Committee and Rohm & Haas Co. have recommended that the Commission eliminate the words "* * * and destructible polyester labels * * *" from the definition of permanent label set forth in § 1201.2(a)(20) as it is claimed that such labels cannot be permanent. The purpose of the permanent labels required in § 1201.5 is to ensure that a label cannot be transferred from the glazing material for which it is intended to some other glazing material. A destructible polyester label meets this intent. Therefore, the Commission has not changed the definition of permanent label now found at § 1201.2(a)(22) of the final standard.

E. *Economic considerations.* Numerous comments have been received relative to the economic implications of the proposed standard. The significant comments and the Commission's response thereto are set forth below.

1. *Laminated glass.* a. Buchmin Industries, Ford Motor Co., the Glass Tempering Association, Globe Amerada Glass Co., and the Glass Laminators Committee commented that currently manufactured laminated glass could not pass the 400 foot pound impact test level of § 1201.4(d)(1) of the proposed standard for Category II products. (See § 1201.2(a)(4)). Two of the commentors stated that this inability to pass the Category II impact levels would result in the elimination of the use of laminated glass in Category II products. Another commentor stated the plastic inner layer in laminated glass would have to be doubled in thickness to .030 inches in order to pass the impact test for Category II products. The commentors thus maintained that the standard would have an adverse economic effect on the laminated glass industry.

The Commission believes laminated glass currently used for Category I applications can meet the 150 foot pound impact test requirements found at § 1201.4(d)(1) of the proposal. However, not all laminated glass currently used for Category II applications can meet the Category II 400 foot pound impact test requirements. At the time the proposed standard was published most of the laminated glass applications covered by the proposal required classification into Category II. The final standard has revised upward the division point between Category I and Category II from 6 square feet to 9 square feet (See § 1201.2(a)(3) and (4)). As a result, more applications for laminated glass covered by the standard will fall into Category I. However, many applications within the scope of the standard will still be covered by Category II requirements.

Manufacturers have indicated to the Commission that to pass the 400 foot pound test, the standard .015 inch plastic interlayer material now used in laminated glass would need to be doubled to .030 inch. (Official Transcript of Proceedings before the Consumer Product Safety Commission, page 33.) There is no technological impediment to meeting the standard, i.e., an additional .015 inch would not create a problem in fitting frames because current manufacturing tolerances on glazing and framing materials should accommodate this increase. However, manufacturers are concerned about the economic consequences of doubling the size of the interlayer material.

The Commission has obtained the following information on the possible economic consequences of this change. The incremental cost to the consumer for laminated glass with the thicker interlayer will vary because of the variance in mark ups, which depends primarily on the particular end use application and the distribution method. The incremental cost at retail is estimated to range from 55 cents to 65 cents per square foot for most applications. Because the standard should not affect the price of competitive glazing materials, such as tempered glass and plastics, the concern of laminated glass manufacturers for their product is understandable. It is difficult to assess how seriously the price change will affect the market share of the 17 laminated glass manufacturers. However, there is some basis for suggesting that the laminated glass industry will maintain its overall market share.

First, the major share of the market held by the laminated glass industry as a whole is in the motor vehicle field. Since motor vehicles are not within the Commission's jurisdiction, automotive glazing materials are not subject to this standard. Secondly, some of the specialty laminated glass within the scope of the standard, and used, for example, for sound reduction, security, bullet proofing, light glare, and heat reduction can meet the Category II, 400 foot pound requirements at the present time.

In addition, it appears likely that the laminated glass industry will maintain its competitive advantage in the important replacement market which currently comprises more than half of all laminated glass sales for applications within the scope of the standard.

Tempered glass is cheaper than laminated glass. However, in much of the replacement market laminated glass has the price advantage over tempered glass since laminated glass can be installed almost immediately when needed, eliminating expensive board up charges which are associated with the extended delivery time of non-standard size tempered glass. With the increased cost of laminated glass in Category II applications caused by the standard, the price advantage of laminated glass over tempered glass in the replacement market is no longer certain. Nevertheless, estimates of board up costs associated with tempered glass (around $80) and data on the incremental cost of laminated glass indicate that laminated glass is likely to retain its price advantage over tempered glass by a narrow margin under most conditions. An analysis of this advantage is included in the Commission's Economic Impact Statement, dated December 14, 1976, which is included in the public record available in the Office of the Secretary of the Commission. Under certain conditions the price advantage of laminated glass could be lost, for example, if the variable board up costs are significantly below normal and the variable mark ups on laminated glass are on the high side. All in all, considering the relative price and the quick replacement advantage of laminated over tempered glazing material, there is reason to believe that laminated will not lose a significant share of the replacement market to tempered glass.

Laminated glass is currently priced about the same as plastics at the glazing dealer level. Both materials are used in the replacement market, since they can be easily stocked and readily cut to a custom size. An important use of laminated glass in the replacement market is for fixed panels in nonresidential entranceways. Presently, laminated is preferred to plastics in this use for esthetic reasons, for example, because it has better scratch resistance and is less likely to discolor. Considering the unique physical characteristics of laminated glass, it is unlikely that the price increase of laminated glass will cause it to lose a significant share of the replacement market to plastics.

In summary, if the laminated glass industry does double the thickness of the plastic interlayer for Category II applications in order to meet the standard, it appears likely that its market share generally will be maintained.

The effect of the standard will vary among the 17 U.S. firms that manufacture laminated glass. For most of these firms, laminated glass production affected by the standard would be well under 10 percent of the individual firm's total production of glazing materials, such as tempered, annealed glass and laminated glass unaffected by the standard. For at least one firm, the figure could reach 25 percent. For the largest firms, the figure is near zero.

Finally, it should be pointed out that the standard could provide increased sales opportunities for laminated glass since noncomplying glazing material will relinquish its share of the replacement market.

b. Several commentors from the U.S. laminated industry expressed a concern that the proposed standard would lead to major foreign inroads.

The possibility of increased foreign competition exists regardless of a CPSC standard. It is the Commission's view that the effect of the standard on the import situation will be minimal since the manufacturing cost differential between domestic and foreign firms will remain nearly constant. The additional interlayer plastic material required to meet the standard's 400 ft lb test is nearly equally priced for domestic and foreign firms.

2. *Wired glass.* The C–E Glass Company commented that the proposed standard would have a deleterious economic effect on the wired glass industry.

After reviewing information presented by the commentor, and its own analysis, the Commission concludes that the proposed standard will cause serious economic disruptions in the wired glass industry because technological improvements in the product will need to be made beforew ired glass can be used in Category I (low energy) applications, and because it probably will not be usable at all in Category II (high energy) applications, because the product probably will not be able to pass the impact test of § 1201.4(d)(1). Other than for the effects on wired glass manufacturers, disruption will be minor in most markets where wired glass is incorporated into a consumer product, since in most applications a complying glazing material is readily available as a substitute for wired glass and wired glass is only 2 percent of the total glazing used in the U.S. annually. However, in the market for doors and assemblies intended to retard the passage of fire, the unique physical properties of wired glass appear to make it the only practical material at this time for use in fire doors.

Therefore, depending on the success the wired glass industry has in technologically improving its products, the disruption to the fire door and fire assembly market could be extremely significant.

The Commission, for reasons more fully discussed in section B above, has in the final standard revised the division line between Category I and Category II doors and glazed panels from 6 square feet to 9 square feet.

(See § 1201.2(a)(3) and (4).) As a result, wired glass for use in doors intended to retard the passage of fire would now generally only be subject to the 150 foot pound impact requirements of Category I. (§ 1201.4(d)(1).)

Nevertheless, as described earlier in this preamble, since it is doubtful that much wired glass can now comply with the 150 foot pound Category I impact test requirements, the Commission has concluded that there is good cause for deferring for a period of 2½ years application of the standard to wired glass intended to retard the passage of fire. This period will allow the industry time to develop the technology necessary to produce glazing materials for such applications which will meet Category I requirements, and will allow time to amend federal, state and municipal fire codes to permit the use of the improved glazing material. This decision is reflected in §§ 1201.1(c)(1) and 1201.7 of the final standard.

3. *Organic-coated glass.* Comments were submitted on the economic implications of the proposed standard with respect to organic-coated glass.

Applications of a polymer film to glazing already in place is a relatively new concept to the field of architectural glazing with significant benefits for consumers. It allows consumers to upgrade glazing material for safety or for energy economy without replacing glazing material already installed. Comments expressed concern that this benefit might be lost to consumers under the standard. However, since the application of polymer film to glazing already in place is not within the scope of the standard, the Commission does not expect this market to be disrupted.

In most currently marketed thicknesses, organic coated glass which has the film applied to annealed glass at the factory cannot meet the Category II impact requirements of § 1201.4(d)(1). Some members of the industry believe that a market limited to Category I products, alone is too small and segmented to be profitable for most manufacturers. The revised upward division point between Category I and Category II doors, storm doors, and glazed panels in the final standard will ease this problem (see §§ 1201.2(a)(3) and (4)). It is not clear to what extent the factory produced organic coated glass market will be disrupted. However, the economic impact in relation to the entire glazing industry will be negligible, since this material accounts for less than ⅓ of one percent of the total volume.

4. *Summary of economic impact.* The discussions above indicate that certain segments of the glazing industry are likely to be adversely affected by the standard. Specifically, there is likely to be disruption to the wired glass (other than fire door uses), the organic-coated glass market and, to a lesser extent, in the laminated glass market. However, these markets are small in relation to the entire industry. For the glazing industry in general, the disruptions and dislocations of existing manufacturing and commercial practices due to the standard are expected to be minor.

5. *Cost benefit analysis.* A comment received from the Council on Wage and Price Stability (CWPS) outlined a formal cost benefit analysis and urged that this approach be adopted by the Commission. While the Commission is required by section 9(c) of the CPSA, 15 U.S.C. 2058(c) to consider and make findings regarding certain economic matters, the act does not require the Commission to conduct a cost benefit analysis. The Commission has made the required findings in § 1201.1(d) of the standard and has discussed economic effects of the standard in this section of the preamble. Because important social costs and benefits have not been adequately identified and quantified in the present state of the art, the Commission believes that there are at this time substantial questions concerning the usefulness of cost benefit analysis when applied to product safety. However, the Commission has made certain cost benefit calculations, which are part of the public record.

In the comment, CWPS performed a rough calculation which indicated that the costs of the standard far exceed the benefits. The Commission believes that the CWPS calculation contains inadequacies and that CWPS has not supported its conclusion. Important benefits which are not easily quantifiable were ignored and implicitly assigned a value of zero; examples include savings to consumers due to reduced breakage of safety glazing, possible reduction in retail prices due to distribution efficiencies made possible by a uniform national standard, and social benefits from reduced pain and suffering. In addition, the calculation failed to recognize fully the need for dynamic analysis when considering both cost and benefit streams over a period of time.

Other potential economic effects of the standard taken into account by the Commission are discussed in an economic analysis prepared by the Commission and the findings set forth in § 1201.1(d) of the standard. A copy of the Commission's Economic Impact Statement is included in the public record and may be seen in the Office of the Secretary.

F. *Stockpiling.* Section 1201.6 of the proposed standard set forth provisions relative to what the Commission considered to be prohibited acts of stockpiling within the scope of section 9(d)(2) of the CPSA (15 U.S.C. 2058(d)(2)). This section authorizes the Commission to prohibit manufacturers from stockpiling a product subject to a consumer product safety standard between issuance of the final standard and its effective date. Stockpiling is defined as manufacturing or importing of a product during this time period at a rate significantly greater than the rate at which the product was produced or imported during a base period (set by rule) ending prior to the promulgation date.

The proposed stockpiling provision, § 1201.6, specified that manufacturers, fabricators, and importers of certain architectural products who incorporate glazing material into those products shall not incorporate glazing materials which do not comply with the requirements of the standard between the date the final standard is issued and the date the standard becomes effective, at a rate which is greater than the rate of production or importation during the base period plus ten percent.

The Consumer Safety Glazing Committee, the Glass Division of the Ford Motor Company, and the Glass Tempering Association commented that the fixed base period dates proposed in § 1201.6(c)(2) were inappropriate. The Commission believes that the fixed base period dates were appropriate for the proposed standard, and the earlier timetable for publication of the final standard. However, the intent of the stockpiling provision is to prevent a manufacturer from circumventing the purpose of a consumer product safety rule while permitting the manufacturer to continue at production rates that would have been typical in the absence of a rule. Therefore, it is appropriate for a base period to be set that takes into account the publication date of the standard. The Commission, therefore, has determined that the stockpiling provision be modified to provide for a base period related to the publication date as set forth below at § 1201.6.

IV. Other Considerations

A. *Environmental effects of the standard.* Prior to publishing the proposed standard, the Commission considered the

environmental effects of its action and determined that there was no potentially significant environmental effect associated with the implementation of the proposed standard. Because the factors leading to this determination have not changed as a result of any changes, additions, or corrections made in the standard as adopted below, and in view of its Economic Impact Statement of December 14, 1976, the Commission reaffirms its decision that there is no potentially significant environmental effect associated with the promulgation of the standard. The factors leading to the original determination were set forth in an environmental assessment of the proposed standard which may be seen in the Office of the Secretary.

B. *Certification and labeling.* 1. Comments were received from the Consumer Safety Glazing Committee and PPG Industries requesting the Commission to specify in the final standard a reasonable testing program for purposes of certifying that glazing materials and products subject to the standard comply with its requirements; and to include provisions within the standard for certification and labeling of glazing materials and products for compliance with the standard. Associated Laboratories recommended that the Commission include in the provisions of the final standard a specification of the number of specimens which must be tested to determine compliance with the standard. Ford Motor Company's Glass Division requested the Commission to issue product identification labeling provisions pursuant to section 14(c) of the CPSA. Additional comments and suggestions with respect to numbers of specimens, certification, and labeling were submitted by the Glass Tempering Association, the Flat Glass Marketing Association, the Plastic Safety Glazing Committee, PPG Industries, the Anderson Manufacturing Company, Rohm and Haas Company, the Fourco Glass Company, and Sheffield Poly-Glaz, Inc.

The standard does not impose any testing requirements upon manufacturers of glazing materials. However, section 14(a) of the CPSA requires manufacturers and private labelers of products subject to standards to issue certificates of conformance, based on a test of each product or upon a reasonable testing program. Section 14(b) authorizes the Commission to prescribe by rule reasonable testing programs. The Commission anticipates issuing such a rule under the authority of section 14(b). The rule will be issued in accordance with 5 U.S.C. 553 (Administrative Procedure Act).

In issuing a rule under section 14, the Commission will consider, among other things, such matters as the number of specimens to be tested in any reasonable testing program, possible alternative tests that industry members might conduct, existing third party certification, and labeling both before and after the glazing material has been cut. It is anticipated that such a regulation will be issued prior to the effective date of the architectural glazing material standard to become effective at the same time as the standard. If it appears that the certification rule under section 14 could not be made effective at the same time as the standard, the Commission will consider an extension in the effective date of the standard.

2. Ford Motor Co. and the Glass Tempering Association requested that provision be made for permitting the use of glazing materials after the effective date of the standard which were certified to comply with previously existing standards, but which also might meet the requirements of Part 1201. The Commission believes that the effective date of the standard contains an adequate lead time for fabricators to exhaust supplies of glazing material that have not been certified as complying with the standard and for glazing material manufacturers to provide glazing materials which have been certified as complying with the standard. However, the Commission will consider these concerns in the development of the certification and labeling regulation.

C. *Preemption.* The City of Phoenix, Arizona questioned the wisdom of the Commission's preempting local requirements for architectural glazing material.

Section 26(a) of the Act (15 U.S.C. 2075(a)) provides that whenever a consumer product safety standard issued under the act is in effect and applies to a risk of injury associated with a consumer product, no state or political subdivision of a state shall have any authority either to establish or to continue in effect any provision of a safety standard or regulation which prescribes any requirements as to the performance, composition, contents, design, finish, construction, packaging, or labeling of such products which are designed to deal with the same risk of injury associated with such consumer product, unless such requirements are identical to the requirements of the standard promulgated under the act. This means, in effect, that most state standards in existence that are applicable to the same products and risks of injury subject to regulation under the standard will be completely or substantially preempted by the CPSC standard upon its effective date. Such state standards that address the same risks of injury dealt with by the federal standard must be identical to the federal standard to remain in effect. Thus, the act gives the Commission no discretion to avoid preemption of state and local regulations. It is the view of the Commission, however, that the preemption provisions of the Consumer Product Safety Act would not apply to those products exempted from the scope of this standard by § 1201.1(c).

Section 26(c) of the act as amended (15 U.S.C. 2075(c)), however, provides that upon application of a state or political subdivision thereof, the Commission may by rule, after notice and opportunity for oral presentation of views, exempt from the preemption provisions of section 26(a) (under such conditions as the Commission may impose) a proposed safety standard or regulation described in the application for exemption and which is designed to protect against a risk of injury associated with a consumer product subject to a consumer product safety standard. In such cases, the Commission must find that the proposed standard or regulation (1) provides a significantly higher degree of protection from such risk of injury than the consumer product safety standard under the act, and (2) does not unduly burden interstate commerce. Thus, states and local governments may apply to the Commission for exemption from preemption.

D. *Jurisdiction.* One commentor raised the question of what product the Commission is regulating in its proposed standard, and alleges that there are serious questions about the Commission's jurisdiction over glazing material used in the architectural products identified in the standard.

The consumer products that are the subject of the Commission's standard are the architectural glazing material itself used in storm doors or combination doors, doors, bathtub doors and enclosures, shower doors and enclosures, glazed panels and sliding glass doors (patio-type). In addition, the standard applies to the above enumerated architectural products in which the glazing material is incorporated, in that those products must be constructed of glazing material that complies with the standard.

In regard to the question of jurisdiction, it is the Commission's view that the architectural glazing material and the architectural products in which the glazing material is incorporated is produced or distributed for sale to and/or use or enjoyment of consumers in or around a permanent or temporary household or residence, a school, in recreation, or otherwise. Thus, the glazing material and architectural products subject to the standard are consumer products and within the jurisdiction of the Commission.

E. *Reference standards.* Certain voluntary standards have been referenced in this Part 1201. The references pertain to the voluntary standards issued on the cited dates, and not to any prior or subsequent revisions. Revisions to those reference standards would not be incorporated into the standard unless the Commission amends the standard to incorporate these revisions.

G. *Metric conversions.* This standard was developed using the English system of units. Metric equivalents have been included in the text of the standard for convenience. Metric equivalents have not been added to illustrations 1 through 5. The conversion factors to be used there are:

1 inch = 2.54 centimeters.
1 pound = .4536 kilograms.

H. *Elderly and handicapped.* Section 9(b) of the act, 15 U.S.C. 2058(b), as amended, requires the Commission to consider and take into account the special needs of elderly and handicapped persons to determine the extent to which such persons may be adversely affected by the standard. The Commission has

done so and determined that no such adverse effect will result from the issuance of the standard, because it is unaware of any situation where an elderly or handicapped person would sustain injuries of greater severity because safety glazing had been present, or would be inconvenienced by the presence of safety glazing. To the extent that the elderly and handicapped may be likely to push on glazing to operate doors, their protection would be the same or greater as other persons.

I. *Findings.* Section 9(c) of the CPSA requires that prior to promulgating a consumer product safety rule the Commission shall consider, and shall make appropriate findings for inclusion in such a rule as to: (1) The degree and nature of the risk of injury the rule is designed to eliminate or reduce; (2) the approximate number of consumer products, or types or classes thereof, subject to such rule; (3) the need of the public for the consumer products subject to such rule, and the probable effect of such rule upon the utility, cost, or availability of such products to meet such need; (4) any means of achieving the effect of the order while minimizing adverse effects on competition or disruption or dislocation of manufacturing and other commercial practices consistent with the public health and safety; (5) that the rule is reasonably necessary to eliminate or reduce an unreasonable risk associated with such products; and (6) that the promulgation of the rule is in the public interest (15 U.S.C. 2058(c)).

The findings required by section 9(c) of the act have been made by the Commission and are incorporated in § 1201.1 below.

V. MISCELLANEOUS

In response to a number of comments which were received suggesting editorial changes, and upon its own review, the Commission has made certain revisions in the final standard. Among these changes are the following:

1. Wired glass and annealed glass have been added to the list of products in Table 1 of the final standard, with a notation that both are exempt from the environmental durability tests.

2. The definition of laminated glass contained in proposed § 1201.2(a)(12) has been modified to make it clear that laminated wired glass is to be considered laminated glass. (See § 1201.2(a)(13) of the final standard).

3. A compression tolerance of 10 percent to 15 percent has been added to § 1201.4(b)(1)(v) and to Figure 3.

4. In proposed § 1201.2(a)(31), now set out at § 1201.2(a)(33), the term "* * * properly tempered * * *" has been revised to "* * * highly tempered * * *", and the term "granular pieces" has been revised to read "particles".

5. The latter portion of proposed § 1201.4(b)(1)(i) has been deleted beginning with "* * * except that impact test frames * * *" to reflect that the Commission will only use test frames manufactured to the specifications of the standard.

6. One commenter, the Plastic Safety Glazing Committee, recommended the deletion of the term "Accelerated" from the title heading of § 1201.4(d)(2)(ii) which is "Accelerated weathering test." The Commission has not made this change because all of the testing specified in this section is, in fact, accelerated. Use of the term "accelerated" in this context is consistent with the practice of the National Bureau of Standards.

7. Proposed § 1201.4(e)(1)(i)(D), now set out as §§ 1201.4(e)(1)(iv) and (v), provides criteria for passing the impact test. It has been revised first to state more clearly that a specimen is considered to pass the test if "The specimen does not remain within the subframe and no breakage is caused by the impactor" (§ 1201.4(e)(1)(iv)). This revision covers those situations where the glazing material comes out of the frame upon impact. A new paragraph § 1201.4(e)(1)(v) has been added, to provide the other criterion which was set out in proposed § 1201.4(e)(1)(D). The new paragraph states, "The specimen does not break."

8. The definition of glazed panel, § 1201.2(a)(10)(1), pertaining to glazed panels in residential buildings, has been revised so that the definition includes any panel whose nearest vertical edge is within 12 inches of the door rather than only the first panel. This change is consistent with the intent of the Commission to apply the standard to all glazed panels beginning within 12 inches of a door in residential buildings.

9. The labeling language of proposed § 1201.5(c) has been revised to read "Glaze this side in" and now conforms with ANSI Z97.1–1975 entitled "Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings", September 26, 1975, approved and published by American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

10. Definitions for "jalousie door" and "leaded glass" have been added as §§ 1201.2(a)(12) and (14), and in proposed § 1201.2(a)(25), now set out as § 1201.2(a)(27), the definition of residential buildings, has been revised to additionally include "* * * any structure which is attendant to, a part of, or appurtenant to" the buildings described in the definition. Other definitions have been renumbered as necessary.

11. In response to comments submitted by Phenix Manufacturing Co. and Ford Motor Co., § 1201.1(b) has been revised to make clear that Part 1201 does not apply to glazing materials manufactured on or before the effective date of the standard. However, architectural products enumerated in the standard that are manufactured after the effective date must incorporate glazing materials that comply with the standard.

CONCLUSION

Having considered the offeror's submission, the published proposal, the oral and written response to the proposal, and other relevant material, the Commission issues the safety standard for architectural glazing materials as set forth below:

Therefore, pursuant to provisions of the Consumer Product Safety Act (Sec. 9(a), Pub. L. 92–573, 86 Stat. 1215; 15 U.S.C. 2058(a)), a new Part 1201 is added to Title 16, Chapter II, Subchapter B, as follows:

Sec.
1201.1 Scope, application and findings.
1201.2 Definitions.
1201.3 General requirements.
1201.4 Test procedures.
1201.5 Certification and labeling requirements.
1201.6 Prohibited stockpiling.
1201.7 Effective date.

AUTHORITY: Secs. 2, 3, 7, 9, 14, 19, Pub. L. 92–573, 86 Stat. 1212–17; (15 U.S.C. 2051, 2052, 2056, 2058, 2063, 2068).

§ 1201.1 Scope, application and findings.

(a) *Scope.* This Part 1201, a consumer product safety standard, prescribes the safety requirements for glazing materials used or intended for use in any of the following architectural products:

(1) Storm doors or combination doors.
(2) Doors.
(3) Bathtub doors and enclosures.
(4) Shower doors and enclosures.
(5) Glazed panels.
(6) Sliding glass doors (patio-type).

It also requires that these architectural products which incorporate glazing materials be constructed with glazing materials that meet the requirements of this part. The safety requirements are designed to reduce or eliminate unreasonable risks of death or serious injury to consumers when glazing material is broken by human contact.

(b) *Application.* This Part 1201 shall apply to glazing materials for use in the architectural products listed in paragraph (a) of this section and to those architectural products listed in paragraph (a) of this section if they are made with or incorporate glazing materials. The standard applies to glazing materials and architectural products incorporating glazing materials that are produced or distributed for sale to or for the personal use, consumption or enjoyment of consumers in or around a permanent or temporary household or residence or in recreational, school, public, or other buildings or parts thereof. This Part 1201 applies only to those glazing materials manufactured after the effective date of the standard; and to those architectural products identified in paragraph (a) of this section that are manufactured after the effective date of the standard. Thus, architectural products identified in paragraph (a) of this section manufactured after the effective date of the standard must incorporate glazing materials that comply with the standard. For purposes of this standard, fabricators and persons who assemble glazed panels are considered to be manufacturers of the architectural products listed in paragraph (a) of this section. Architectural glazing materials used in the products listed in paragraph (a) of this section and used in mobile homes are not subject to the

provisions of this Part 1201. While this Part 1201 prescribes a test method to determine whether glazing materials subject to this Part 1201 standard meet the requirements of the standard, the standard itself does not require that a manufacturer test any glazing materials or products subject to the standard. All obligations of manufacturers to perform testing are imposed by section 14 of the Consumer Product Safety Act and certification regulations which will be established by a separate rulemaking proceeding. However, the Commission intends to use the test procedures set forth in this Part 1201 to determine whether materials and products subject to the standard meet the requirements of the standard.

(c) *Exemptions.* The following products, materials and uses are exempt from this Part 1201:

(1) Wired glass used in doors or other assemblies to retard the passage of fire, where such door or assembly is required by a federal, state, local or municipal fire ordinance, except that this exemption shall terminate on January 6, 1980.

(2) Louvers of jalousie doors;

(3) Openings in doors through which a 3 inch diameter sphere is unable to pass;

(4) Leaded glass panels where no individual piece of glass has an area greater than 30 square inches;

(5) Glazing materials used as curved glazed panels in revolving doors;

(6) Commercial refrigerated cabinet glazed doors.

(d) *Findings*—(1) *The degree and nature of the risk of injury the rule is designed to eliminate or reduce.* The Commission finds that the nature of the risks of injury this standard is designed to eliminate or reduce are as follows:

(i) Lacerations, contusions, abrasions, and other injury or death resulting from walking or running into glazed doors or sliding glass doors believed to be open or glazed panels mistaken as a means of ingress or egress, or pushing against glazing material in doors or glazed panels in an attempt to open a door.

(ii) Lacerations, contusions, abrasions, and other injury or death resulting from accidentally falling into or through glazed doors, sliding glass doors, glazed panels, bathtub doors and enclosures and shower doors and enclosures.

(iii) Lacerations, contusions, abrasions, and other injury or death resulting from the act of installing, replacing, storing or otherwise manipulating glazing material in doors, sliding glass doors, glazed panels, bathtub doors and enclosures and shower doors and enclosures, or from broken glazing material in doors, sliding glass doors, glazed panels, bathtub doors and enclosures and shower doors and enclosures. The Commission estimates that 73,000 injuries associated with architectural glazing materials in the architectural products within the scope of this standard were treated in hospital emergency rooms during 1975, and that about 2,400 of these injuries required the patients to be hospitalized. Extrapolating to total injuries in the United States the Commission further estimates that approximately 190,000 injuries were associated with architectural glazing products covered by this standard. Although injuries occur at any age, children aged 14 and under appear to be at particular risk of injury since as a group they represent approximately half the injuries while comprising less than 30 percent of the population. Lacerations are the most common injuries associated with architectural glazing materials and account for 72 percent to 93 percent of the injuries associated with the architectural products identified in paragraph (a) of this section. These lacerative injuries span a broad spectrum of severity and extent of body part affected. During 1975, an estimated 200 injuries were treated in emergency rooms for lacerations over 25 to 50 percent of the victims' bodies and over 7,000 persons were treated for lacerations to the head or face. On the basis of all injury information available to the Commission, it is apparent that the severity of the injuries associated with architectural glazing materials ranges from minor cuts to damage to tendons, nerves, muscles, and blood vessels resulting in extensive surgery. Peripheral nerve injuries result in varying degrees of loss in sensation and motion which may never be restored completely. Tendon and muscle injuries may involve loss of movement. Some victims of architectural glazing material incidents are disfigured, and sustain emotional trauma as well. Severing of arteries and veins has led to death. One way of quantifying the extent of the public health problem relating to injuries associated with products is to estimate the total number of disability days resulting from the injuries. Using average days of restricted activity by age for specific injuries and body parts (Vital and Health Statistics, Series 10, Number 57, National Center for Health Statistics, U.S. Department of Health, Education, and Welfare), it is estimated that about 230,000 days of restricted activity resulted from injuries associated with architectural products which were treated in emergency rooms alone.

(2) *The approximate number of consumer products, or types or classes thereof, subject to the standard.* The types of glazing materials affected by or subject to the standard are laminated glass, tempered glass, wired glass, organic-coated glass, annealed glass, and plastics. Architectural products that incorporate the aforementioned glazing materials that are also affected by or subject to the standard are: storm doors or combination doors, doors, bathtub doors and enclosures, shower doors and enclosures, glazed panels and sliding glass doors (patio-type) (see paragraph (a) of this section). The Commission has estimated that 13 to 16 percent of the total market for glazing material incorporated in products within the scope of the standard will be affected by the standard. Most of the glazing subject to the standard is currently covered by state safety glazing legislation. To date, more than 30 states have enacted safety glazing legislation, but this legislation is neither consistent nor completely uniform among states. Annual markets for the architectural products which incorporate glazing material and that are within the scope of the standard have been estimated by the Commission in terms of square feet of glazed area and number of units. The market for glazing material incorporated in products within the scope of the standard was estimated to be 234.8 million square feet in 1975. These figures are discussed in the Economic Impact Statement, pp. 3–7, and Appendix A to the Economic Impact Statement, pp. 18–30. which are available for review in the Office of the Secretary of the Commission, Washington, D.C. 20207.

(3) *The need of the public for the architectural glazing material and products incorporating that glazing material subject to the standard, and the probable effect of the standard upon the utility, cost or availability of those products to meet the need of the public*—(i) *The need of the public for the architectural glazing materials and products incorporating that glazing material.* The need of the public for architectural products within the scope of the standard incorporating glazing material is substantial since these products serve such functions as transmission of light, visual communication, protection from weather, ventilation, and indoor climate control, and since reasonable substitutes for these products do not exist as a group. Each of the types of glazing material subject to the standard has individual properties which meet public needs, although one type of glazing material is often an acceptable substitute for another.

(ii) *Probable effect of the standard upon the cost of architectural glazing materials and architectural products incorporating the glazing material to meet the need of the public for the products.* The probable cost effects of the standard for architectural glazing materials are listed below.

(A) The cost impact of the standard on consumers will be concentrated in those states with no present state safety glazing legislation. In those states, the average increase in cost per housing start resulting from the standard is estimated to range from $30 to $50, or approximately one-tenth of one percent of the price of a typical new house; and the cost for residential remodeling and replacement is expected to be in the range of $0.25 to $0.30 per household annually.

(B) The increased cost of glazing material for nonresidential uses will be paid ultimately by consumers through higher prices of goods and services. Generally, the increased cost of glazing is not passed to consumers immediately, but is spread over the life of the nonresidential structure. Therefore, the increased cost to consumers for glazing material in nonresidential structures will probably rise slowly over time to an annual level of approximately $1.10 per household in states with no safety glazing legislation and $0.20 to $0.50 per household in the other states. In many of the states with state regulations, the impact of the standard on residential construction and new housing prices will be near zero,

since most of the glazing is currently covered by the state glazing legislation.

(C) The probable effect of the standard on the various glazing materials within the scope of the standard will differ. The retail price of laminated glass used in some Category II applications will probably increase by 10 to 15 percent per square foot. The incremental cost to consumers for ungraded laminated glass is estimated to be approximately $0.14 per household, annually. The cost to consumers for tempered glass, organic-coated glass, and plastics is not expected to increase because of the standard. Information available to the Commission indicates that the technology needed for producing wired glass which can comply with the standard is not readily available. See Appendix A of the Economic Impact Statement, pp. 45–56, for the incremental cost calculation by product category and application.

(iii) *Probable effect of the standard upon the utility of architectural glazing materials and architectural products incorporating the glazing materials to meet the need of the public for the products.* The probable effect of the standard in regard to the utility of architectural glazing materials and the architectural products incorporating glazing material should be to increase the utility of the products. The basic effect of the standard would be the substitution of certain safer glazing materials for annealed glass in certain architectural products. The Commission believes that such a substitution would increase utility for most consumers because of the usually increased durability of the glazing material that complies with the Commission's standard, and the knowledge that the product incorporating the glazing material is safer. There will be disutility for those consumers who prefer non-complying wired glass and organic-coated glass when these materials become unavailable for certain applications due to their likely inability to comply with the standard. However, the share of the glazing material market claimed by organic-coated and wired glass is small.

(iv) *Probable effect of the standard upon the availability of architectural glazing materials and architectural products incorporating the glazing materials to meet the need of the public for the products.* The Commission finds that the proposed standard should not have impacts of significant magnitude on the availability of architectural products within the scope of the standard, since domestic production capacity appears to be sufficient to handle any increased demand for glazing material to be used in those products. In addition, an increased demand for raw materials necessary to manufacture glazing materials that comply with the standard will be small in comparison to the volume of raw materials currently used for glazing for the products that will be subject to the standard. Furthermore, no major change in demand for the architectural products subject to the standard incorporating glazing materials which would affect production is expected. The Commission finds that, in the absence of technological advances, certain glazing materials will no longer be available for particular applications. Unless technological advances are made, wired glass will be unavailable for use in the architectural products within the scope of the standard with the exception of fire door applications where special provisions of the standard apply. Similarly, organic-coated glass which has the film applied to annealed glass at the factory may no longer be available for Category II products due to an inability to pass those impact test provisions of the standard. The availability of glass replacement glazing in residential applications may be reduced, since plastic glazing often will be the only economical material available to consumers when immediate replacement is needed.

(4) *Any means of achieving the objectives of the standard while minimizing adverse effects on competition or disruption or dislocation of manufacturing and other commercial practices consistent with the public health and safety.* The Commission has considered other means of achieving the objective of the standard, but has found none that it believes would have fewer adverse effects on competition or that would cause less disruption or dislocation of manufacturing and other commerical practices, consistent with the public health and safety. For the glazing industry in general, the disruptions and dislocations of existing manufacturing and commercial practices due to the standard are expected to be minor. However, it is possible that individual segments of the glazing materials industry are likely to be adversely affected by the standard. Specifically, there is likely to be disruption to the wired glass market, the organic-coated glass market and, to a lesser extent, to the laminated glass market. Manufacturers of wired glass will face a serious problem because technological improvements in the product will need to be made before wired glass can be used in Category I applications and because it probably will not be usable at all in Category II applications (see § 1201.2(a) (3) and (4) of the standard), since there appears to be little prospect at this time of developing a wired glass product capable of withstanding the Category II, 400 foot pound impact test prescribed in § 1201.4 of the standard. Laminated glass currently used for Category I applications can meet the 150 foot pound impact test requirements, but not all laminated glass currently used for Category II applications can meet the 400 foot pound impact test requirements. The price increase for technologically upgrading laminated glass will be borne by consumers. The Commission believes, however, that the competitive impact of the proposed changes would not severely weaken the position of laminated glass in the market place. The wired glass, organic-coated glass, and laminated glass markets affected by the standard are small in relation to the entire industry. The standard is not expected to have an appreciable impact on foreign or domestic competition. Increased competition is expected between primary glass temperers and regional temperers, with primary temperers taking an increased share of the original storm door, sliding door, bathtub enclosure and shower door markets. Sales of nonresidential glazing for major nonresidential buildings will remain with the primary glass companies. The regional temperers are expected to handle almost all the tempering of glazing for smaller nonresidential buildings. Thus, they will gain some of this market at the expense of local dealers and distributors. However, the distributors and dealers probably will operate as order takers for the smallest jobs. It is expected that glazing distibutors and dealers will experience reduced market shares in both the residential and nonresidential new glazing markets. This will occur as a result of the transfer of business to the primary glass manufacturers and regional temperers, since tempered glass must be produced to size and it is not feasible to keep in inventory all sizes which might be needed.

(5) *Summary finding.* The Commission finds that there are unreasonable risks of injury associated with architectural glazing materials used in the architectural products listed in paragraph (a) of this section. In assessing the question of whether unreasonable risks of injury or injury potential are associated with architectural glazing materials, the Commission has balanced the degree, nature and frequency of injury against the potential effect of the standard on the ability of architectural glazing materials to meet the need of the public and the effect of the standard on the cost, utility, and availability of architectural glazing materials to meet that need. The Commission finds that this standard, including its effective date, is reasonably necessary to eliminate or reduce the unreasonable risks of injury associated with architectural glazing materials and that promulgation of the standard is in the public interest.

§ 1201.2 Definitions.

(a) As used in this Part 1201:

(1) "Annealed glass" means glass that has been subjected to a slow, controlled cooling process during manufacture to control residual stresses so that it can be cut or subjected to other fabrication. Regular polished plate, float, sheet, rolled, and some patterned surface glasses are examples of annealed glass.

(2) "Bathtub doors and enclosures" means assemblies of panels and/or doors that are installed on the lip of or immediately surrounding a bathtub.

(3) "Category I products" means any of the following architectural products:

(i) Storm doors or combination doors that contain no single piece of glazing material greater than 9 square feet (0.83 square meters) in surface area of one side of the piece of glazing material.

(ii) Doors that contain no single piece of glazing material greater than 9 square feet (0.83 square meters) in surface area of one side of the piece of glazing material.

(iii) Glazed panels that contain no single piece of glazing material greater

than 9 square feet (0.83 square meters) in surface area of one side of the piece of glazing material.

(4) "Category II products" means any of the following architectural products:

(i) Shower doors and enclosures.

(ii) Bathtub doors and enclosures.

(iii) Sliding glass doors (patio type).

(iv) Storm doors or combination doors that contain any piece of glazing material greater than 9 square feet (0.83 square meters) in surface area of one side of the piece of glazing material.

(v) Doors that contain any piece of glazing material greater than 9 square feet (0.83 square meters) in surface area of one side of the piece of glazing material.

(vi) Glazed panels that contain any piece of glazing material greater than 9 square feet (0.83 square meters) in surface area of one side of the piece of glazing material.

(5) "Distributor" means a person to whom a consumer product is delivered or sold for purposes of distribution in commerce, including persons cutting glazing material to size, except that such term does not include a manufacturer or retailer of such product.

(6) "Distribution in commerce" means to sell in commerce, to introduce or deliver for introduction into commerce, or to hold for sale or distribution after introduction into commerce.

(7) "Door" means an assembly that is installed in an interior or exterior wall; that is movable in a sliding, pivoting, hinged, or revolving manner of movement; and that is used by consumers to produce or close off an opening for use as a means of human passage.

(8) "Fabricator" means any person who assembles or otherwise incorporates glazing materials into an architectural product listed in § 1201.1(a). A fabricator is considered a manufacturer as defined in paragraph (a)(16) of this section.

(9) "Glass" means a hard, brittle, amorphous substance produced by fusion, usually consisting of mutually dissolved silica and silicates that also contains sods and lime. It may be transparent, translucent, or opaque.

(10) "Glazed panel" means a glazing material used in any building listed in § 1201.1(b) that is:

(i) In residential buildings, any piece of operable or nonoperable glazing material adjacent to a door whose nearest vertical edge is within 12 inches (31 centimeters) from the door in a closed position, and whose bottom edge is below the level of the top of the door; or

(ii) In all buildings other than residential buildings, any piece of operable or nonoperable glazing material adjacent to a door whose nearest vertical edge is within 48 inches (1.2 meters) from the door in a closed position and whose bottom edge is below the level of the top of the door; or

(iii) In all buildings other than residential buildings, all panes not described in paragraph (a)(10)(ii) of this section where:

(A) The lowest edge of the glazing material is less than 18 inches (46 centimeters) above any floor or any walking surface; and

(B) The exposed glazing material in such panel exceeds 9 square feet (0.3 square meters); and

(C) There is a walking surface on both sides, either of which is within 36 inches (92 centimeters) of such panel and the horizontal planes of such walking surfaces are within 12 inches (31 centimeters) of each other.

(iv) Not included in the definition of glazed panels are:

(A) Panels where an intervening interior permanent wall is between the door and the panel(s) described in paragraph (a)(10)(ii) of this section;

(B) Panels described in paragraph (a)(10)(iii) of this section that have a horizontal member such as a piece of the framing or permanent chair rail no less than 1½ inches (4 centimeters) in width, which is located between 24 and 36 inches (61 and 91 centimeters) above the walking surface.

(11) "Glazing material" means plastics, glass, including annealed glass, organic-coated glass, tempered glass, laminated glass, wired glass; or combinations thereof where these are used:

(i) In openings through the architectural products listed in § 1201.1(a), or

(ii) As the architectural products themselves, e.g. glazed panels or unframed doors.

(12) "Jalousie door" means a door (as "door" is defined in paragraph (a)(7) of this section) having an opening glazed with operable, overlapping louvers. Each louver is one of a series of overlapping pieces of glazing material designed to admit ventilation and light but exclude rain and is typically operated by a crank and gear mechanism.

(13) "Laminated glass" means glazing material composed of two or more pieces of glass, each piece being either tempered glass, heat strengthened glass, annealed glass or wired glass, bonded to an intervening layer or layers of resilient plastic material.

(14) "Leaded glass" means a decorative composite glazing material made of individual pieces of glass whose circumference is enclosed by lengths of durable metal such as lead or zinc and the pieces of glass are completely held together and supported by such metal.

(15) "Manufacture" means to manufacture, produce or assemble.

(16) "Manufacturer" means any person who manufactures, fabricates or imports a glazing material or architectural product listed in § 1201.1(a) that incorporates glazing material.

(17) "Mirror" means a treated, polished or smooth glazing material that forms images by the reflection of light.

(18) "Mobile home" means a structure transportable in one or more sections, which is eight body feet (2.4 body meters) or more in width and is thirty-two body feet (9.7 body meters) or more in length, and which is built on a permanent chassis and designed to be used as a dwelling with or without a permanent foundation when connected to the required utilities.

(19) "Other buildings or parts thereof" means buildings or parts thereof (other than residential, school, public, or recreational buildings) in which all or part of the building is open to the public with or without specific invitation. Included are buildings or parts thereof such as banks and recreational or retail facilities in a building and multiuse buildings that contain residential units.

(20) "Organic-coated glass" means a glazing material consisting of a piece of glass, coated and bonded on one or both sides with an applied polymeric coating, sheeting, or film.

(21) "Patio door" (See "sliding glass doors (patio-type)" in paragraph (a)(31) of this section).

(22) "Permanent label" means a label that will remain permanently legible and visible after installation of the glazing material and that would be destroyed in attempts to remove it from the glazing material and includes (but is not limited to) sandblast, acid etch, hot-stamp, and destructible polyester labels.

(23) "Plastic" means a single sheet of organic glazing material, a combination of two or more such sheets laminated or coextruded together, or a combination of such sheets and reinforcement material in the form of fiber or flakes.

(24) "Private labeler" means an owner of a brand or trademark on the label of a consumer product which bears a private label, and includes any fabricator, distributor, or installer who cuts certified and permanently labeled glazing materials into smaller pieces.

(25) "Public building" means a building of public assembly or meeting including (but not limited to) a museum, place of worship, or restaurant.

(26) "Recreational building" means a building used for recreational purposes including (but not limited to) a theater, stadium, gymnasium, amusement park building or library.

(27) "Residential building" means a building, permanent or temporary, such as a single or multifamily residence, including (but not limited to) a house, apartment building, lodging home, dormitory, hotel, motel, hospital, sanitarium, and nursing home, used as a dwelling for one or more persons or families and any structure which is attached to, a part of, or appurtenant to such a building. Public areas of all residential buildings, such as lobbies and other common facilities, are included within the definition of "other buildings or parts thereof" in paragraph (a)(19) of this section. For purposes of this Part 1201, a mobile home as defined in paragraph (a)(18) of this section is not considered to be a residential building.

(28) "Retailer" means a person to whom a consumer product is delivered or sold for purposes of sale or distribution by such person to a consumer; the term retailer includes a person who cuts glazing material to size for consumers.

(29) "School building" means a building designed primarily for the conduct of educational instruction and includes the

classrooms, libraries, administrative offices, auditoriums, eating and sanitary facilities, stadiums, gymnasiums and all other structures associated with such buildings.

(30) "Shower door and enclosure" means an assembly of one or more panels installed to form all or part of the wall and or door of a shower stall.

(31) "Sliding glass door (patio-type)" means an assembly of one or more panels, at least one of which is suitably movable for use as a means of human ingress or egress. The term includes the nonmovable and movable panels of such assembly.

(32) "Storm door (or combination door)" means a movable assembly, used in tandem with an exterior door to protect the exterior door against weather elements and/or to improve indoor climate control.

(33) "Tempered glass" means a piece of specially heat treated or chemically treated glass that cannot be cut, drilled, ground, or polished after treatment without fracture. When fractured at any point, if highly tempered, the entire piece breaks into small particles.

(34) "Wired glass" means a single piece of annealed glass that contains wire embedded in the body of the glass.

(35) "Commission" means the Consumer Product Safety Commission.

(b) Definitions given in the Consumer Product Safety Act, and not repeated in this section, are applicable to this Part 1201.

(c) Test methods and recommended practices published by the American Society for Testing and Materials (ASTM), and referred to in this Part 1201, are hereby incorporated by reference into this Part 1201.[1]

§ 1201.3 General requirements.

(a) All glazing materials to which this standard applies, as described in § 1201.1, shall meet the impact and environmental test requirements in § 1201.4, and shall be labeled by manufacturers in accordance with § 1201.5.

(b) Glazing materials used in architectural products not listed in § 1201.1(a) are not subject to this Part 1201.

§ 1201.4 Test procedures.

(a) *Types of tests*—(1) *Impact test.* Specimens shall be struck as prescribed by paragraph (d)(1) of this section using equipment specified by paragraphs (b)(1) and (2) of this section. Results of the impact test are to be interpreted in accordance with paragraph (e)(1) of this section. The test specimens shall be selected in accordance with paragraph (c)(1) and (2) of this section.

(2) *Accelerated environmental durability tests.* Each specimen of glazing material subject to this Part 1201 shall be tested in accordance with the accelerated tests referenced in table 1, "Accelerated Tests" of this section. However, tempered glass, wired glass, and annealed glass are not required to be subjected to the accelerated environmental durability tests.

TABLE 1.—*Accelerated tests (applicable paragraphs)*

Glazing material	Specimen	Test equipment	Exposure	Criteria for passing
Laminated glass	Sec. 1201.4 (c)(1) and (c)(3)(i).	Sec. 1201.4(b)(3)(i)	Sec. 1201.4(d)(2)(i)	Sec. 1201.4(e)(2)(i)
Organic-coated glass.	Sec. 1201.4 (c)(1) and (c)(3)(ii) (B).	Sec. 1201.4(b)(3)(ii)	Sec. 1201.4(d)(2)(ii) (B).	Sec. 1201.4(e)(2)(ii) (B).
Plastics	Sec. 1201.4 (c)(1) and (c)(3)(ii)(A).	Sec. 1201.4(b)(3)(ii)	Sec. 1201.4(d)(2)(ii) (A).	Sec. 1201.4(e)(2)(ii) (A).
Plastics (indoor)	Sec. 1201.4 (c)(1) and (c)(3)(iii).	Sec. 1201.4(b)(3)(iii)	Sec. 1201.4(d)(2)(iii)	Sec. 1201.4(e)(2)(ii) (C).
Tempered glass	Exempt	Exempt	Exempt	Exempt
Wired glass	do	do	do	Do.
Annealed glass	do	do	do	Do

(3) Separate testing is required for different glazing materials or for differences within a type of glazing material that could noticeably affect performance in the impact or environmental durability tests. Such differences could include (but are not limited to): Nominal thickness or thicknesses, method of manufacture (in appropriate cases), types and amounts of additives, and composition of base materials and adhesives.

(b) *Test equipment*—(1) *Impact test frame and subframe.* (See figures 1, 2, 3, and 4.) (i) The impact test frame shall be constructed to minimize movement and deflection of its members during testing. For this purpose, the structural framing and bracing members shall be steel angles 3 inches by 5 inches by ¼ inch (7.7 centimeters by 12.7 centimeters by 0.7 centimeters) or other sections and materials of equal or greater rigidity.

(ii) The structural framing shall be welded or securely bolted at the corners and braced by one of the alternate methods shown in figure 1 and shall be securely bolted to the floor.

(iii) The subframe for securing the test specimen on all four edges shall be reinforced at each corner. The material is shown as wood in figure 3, but other materials may be used provided the test specimen will contact only the neoprene strips.

(iv) Any reasonable means may be used to secure the subframe to the test frame so long as the mounting is secure and the pressure on the glazing in the subframe is not significantly altered when the subframe is removed.

(v) Pressures on the test specimen shall be controlled, and the compression of the neoprene strips shall be between 10 and 15 percent of the original thickness of the neoprene. Securing methods such as wing bolts and clamps shall be uniformly spaced no greater than 18 inches (45 centimeters) apart with no fewer than two on any edge. To limit the compression of the neoprene and prevent distortion of the subframe, metal shims of an appropriate thickness shall be used as shown in figures 3 and 4.

(2) *Impactor.* (i) The impactor shall be a leather punching bag as shown in figure 5 of this section. The bag shall be filled with No. 7½ chilled lead shot to a total weight of completed assembly before taping, as shown in figure 5, of 100 pounds ±4 ounces (45.36±0.11 kilograms). The rubber bladder shall be left in place and filled through a hole cut into the upper part. After filling the rubber bladder, the top should be either twisted around the threaded metal rod below the metal sleeve or pulled over the metal sleeve and tied with a cord or leather thong. Note that the hanging strap must be removed. The bag should be laced in the normal manner. The exterior of the bag shall be completely covered by ½ inch (1.3 centimeters) wide glass filament reinforced pressure sensitive tape. (Figure 5).

(ii) The impactor shall be supported as shown in figure 2. Provisions shall be made for raising the impactor to drop heights of up to 48 inches (1.22 meters). At its release it shall have been supported so that the pin going through its center was in line with the steel cable. The impactor shall not wobble or oscillate after its release.

(3) *Environmental durability test equipment*—(i) *Boil test.* Two containers of water shall be provided with means to maintain one at 150° ±5° F (66° ±2° C) and the second at a slow boil at atmospheric pressure. The containers shall be large enough to accept a rack holding three specimens, each 12 inches (30 centimeters) square, of the glazing material in a vertical position. The rack shall be positioned so that each specimen is surrounded by at least one inch (2.5 centimeters) of water.

(ii) *Simulated weathering test.* The equipment shall be a xenon arc (water-cooled) Weather-Ometer employing a lamp rated at 6500 watts and automatic light monitoring and control systems. Borosilicate inner and outer filters shall be used. An appropriate water spray cycle shall be used. Operating procedures shall be in accordance with ASTM G 26–70, "Standard Recommended Practice for Operating Light- and Water-Exposure Apparatus (Xenon-Arc Type) for Exposure of Nonmetallic Materials," April 13, 1970, as augmented for plastics by ASTM D 2565–70, "Standard Recommended Practice for Operating Xenon-Arc Type (Water-Cooled) Light- and Water-Exposure Apparatus for Exposure of Plastics," Procedure B, June 12, 1970.

[1] ASTM test methods and recommended practices are approved by, published by, and available for purchase from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

(iii) *Indoor aging test.* A test chamber large enough to contain four specimens of size used in the impact test (see paragraph (c)(2) of this section) shall be used. Hangers shall be provided to support the specimens vertically with a minimum of 4 inches (11 centimeters) of separation for air circulation. The chamber shall be capable of maintaining 140° F (60° C) at 95 percent relative humidity during testing.

(c) *Test specimens*—(1) *Condition of specimens.* All specimens shall be tested as supplied by the manufacturer, following removal of any temporary protective masking materials. No tests shall be commenced before the specimens have been stored in the laboratory for 4 hours. Specimens shall be arranged to permit free circulation of air to all surfaces during this period.

(2) *Impact specimens.* Impact specimens shall be of the largest size manufactured up to a maximum width of 34 inches (86 centimeters) and a maximum height of 76 inches (1.9 meters). Specimens shall be tested for each nominal thickness offered by the manufacturer.

(3) *Environmental durability specimens*—(i) *Boil test.* Three pieces 12 inches by 12 inches (30 centimeters by 30 centimeters) with nominal thickness identical to those submitted for the impact test shall be used.

(ii) *Weathering tests*—(A) *Plastics.* Not less than 10 plastic specimens ½ inches by 5 inches (1.3 centimeters by 12.7 centimeters) by nominal thickness identical to those submitted for the impact test shall be used.

(B) *Organic-coated glass*—(*1*) *Orientation specified.* Six organic-coated glass specimens 2 inches by 6 inches (5 centimeters by 15 centimeters) by nominal thickness identical to those submitted for the impact test shall be used.

(*2*) *Orientation unspecified.* Nine organic-coated glass specimens, 2 inches by 6 inches (5 centimeters by 15 centimeters) by nominal thickness identical to those submitted for the impact test shall be used except that when the glazing material is symmetric across its thickness, six specimens may be used.

(iii) *Indoor service.* Four additional samples identical to those submitted for the impact test.

(d) *Test procedures*—(1) *Impact test procedure.* Each specimen shall be struck within 2 inches (5 centimeters) of its geometric center with the impactor dropped from a single height, designated according to the product category. Specimens for Category I shall be impacted one time from a drop height of 18 to 18½ inches (458 to 470 millimeters). Specimens for Category II shall be impacted one time from drop height of 48 to 48½ inches (1.22 to 1.23 meters). For all specimens that are not symmetric from surface to surface, an equal number of specimens shall be impaoted on each side. For glazing materials which will be evaluated by paragraph (e)(1)(iii) of this section, this impact test procedure is not required.

(2) *Environmental durability test procedures*—(i) *Boil test.* The specimens shall be immersed in the 150° F (66° C) water for 3 minutes. They shall then be quickly removed and immersed in the boiling water and left there for 2 hours. The specimens shall then be removed, cooled, and dried for examination as specified in § 1201.4(e)(2)(i) of this standard.

(ii) *Accelerated weathering test.* The specimens shall be retained in the Weather-Ometer (paragraph (b)(3)(ii) of this section) for a period of 1200±1 hours, and exposed to a radiant flux of 50 microwatts per square centimeter (12 calories per second per square centimeter) while monitoring at a wavelength of 340 nanometers.

(A) *Plastics.* Five of the specimens shall be exposed to radiation and five shall be kept in darkness at 73° F (23° C) for use as controls.

(B) *Organic-coated glass*—(*1*) *Orientation specified.* Three specimens shall be mounted with the surface that is intended to be oriented indoors faced away from the radiation source; the other three specimens shall be kept in darkness at 73° F (23° C) for use as controls. Materials so tested shall be labeled according to § 1201.5(c) of this Part 1201.

(*2*) *Orientation unspecified.* Three specimens shall be mounted with one of the surfaces toward the radiation; three specimens shall be mounted with the other surface toward the radiation, and three specimens shall be kept in darkness at 73° F (23° C) for use as controls. When the glazing material is symmetric across its thickness, three specimens shall be irradiated.

(iii) *Indoor aging test.* The specimens shall be hung in the test chamber for 10 complete cycles (480 hours). The procedure shall be in accordance with procedure A of ASTM D 756–56, "Test for Resistance of Plastics to Accelerated Service Conditioning," September 10, 1956, (Reapproved 1971) except that during the humid phase of the cycle the relative humidity shall be maintained at 95 percent.

(e) *Interpretation of results*—(1) *Impact test.* A glazing material may be qualified for use in both Category I and Category II products if it meets the impact requirements for Category II. A glazing material shall be judged to pass the impact test if the specimen tested meets any one of the criteria listed in paragraphs (e)(1)(i) through (v) of this section:

(i) When breakage occurs (numerous cracks and fissures may occur) no opening shall develop in the test sample through which a 3 inch (76 millimeter) diameter solid steel sphere, weighing 4 pounds ±3 oz (1.81±0.08 kilograms), passes when placed (not dropped) in the opening and permitted to remain for a period of one second. For this criterion, the sample after being impacted shall be placed, while remaining in the subframe, in a horizontal, impact side up position with a minimum of one foot (31 centimeters) of free space immediately beneath the specimen.

(ii) When breakage occurs, what appear to be the 10 largest particles shall be selected within 5 minutes subsequent to the test and shall weigh no more than the equivalent weight of 10 square inches (64 square centimeters) of the original specimen. For the purposes of this section "particle" means a portion of a broken test specimen which is determined by identifying the smallest possible perimeter around all points in the portion of the broken test specimen, always passing along cracks or exposed surfaces.

(iii) The specimen has:

(A) a modulus of elasticity less than 750,000 psi (5,170 megapascal) when measured by ASTM D 790–71, "Standard Method of Test for Flexural Properties of Plastics," October 29, 1971, and

(B) a Rockwell hardness (M or R scale) less than 140 when measured by ASTM D 785–65 (Reapproved 1970), "Standard Method of Test for Rockwell Hardness of Plastics and Electrical Insulating Materials," August 31, 1965.

(iv) The specimen does not remain within the subframe and no breakage is caused by the impactor.

(v) The specimen does not break.

(2) *Environmental durability tests*—(i) *Boil test.* The glass itself may crack in this test, but no bubbles or other defects shall develop more than ½ inch (12 millimeters) from the outer edge of the specimen or from any crack that may develop. Any specimen in which the glass cracks to an extent that confuses the interpretation of the results shall be discarded, and another specimen shall be tested in its stead.

(ii) *Accelerated weathering test*—(A) *Plastics.* (*1*) Plastic specimens shall be evaluated before and after exposure as described in Method B, "Simple Beam (Charpy-Type) Test," of ASTM D 256–73, "Test for Impact Resistance of Plastics and Electrical Insulating Materials," November 27, 1973. The exposed specimens shall be tested with the exposed surface subjected to tension. In the case of thin materials, the span of the specimens shall be reduced to 2 inches (50 millimeters) to avoid having the specimens bend enough to slip between the supports without breaking. For materials that will not break on this 2 inch (50 millimeters) span the specimens shall be notched across the ½ inch (12 millimeters) surface prior to exposure. The notch shall be a 45 degree angle and the radius at the bottom shall be 0.010±0.002 inch (0.25±0.04 millimeters). The thickness of the material beneath the notch shall be uniform within ±0.002 inch (±0.05 millimeters) for all specimens and shall not be less than 70 percent of the specimen thickness. During exposure the notch shall face the radiation source.

(*2*) Plastic materials shall be acceptable if the impact strength is not reduced by more than 25 percent during exposure. Some discoloration is permissible, but defects other than this discoloration shall not be permissible. No bubbles or other noticeable decomposition shall be permissible in the irradiated portion.

(B) *Organic-coated glass.* Specimens shall be judged satisfactory if they pass both the adhesion test and the tensile test described below in paragraph (e)(ii)(B) (*1*) and (*2*) of this section.

(1) *Adhesion test (organic-coated glass only)*—(i) *Specimens.* The specimens for this test are the 2 inch by 6 inch (5 centimeters by 15 centimeters) weathered specimens and the control specimens. The specimens shall be conditioned just prior to the performance of the adhesion test at 73° ±6° F (23° ±3° C) and 50 ±5 percent relative humidity for 24 hours.

(ii) *Apparatus.* The test apparatus shall consist of a constant-rate-of-extension-type (CRE) tensile tester with the moving crosshead set to move at 12 inches per minute (5 millimeters per second) and load range such that the average pull force will fall at 30 to 50 percent of full scale. A cutter shall be used containing new razor blades for cutting 1 inch (25 millimeter) wide specimens of the organic coating on the glass. The razor blades shall be used one time only.

(iii) *Procedure.* Using the razor cutter, cut a straight, 1 inch (25 millimeter) wide strip of the organic coating in the lengthwise direction of the glass specimen along and within ¼ inch (6 millimeters) of one edge. Peel back, cleanly and evenly, about 2 inches (50 millimeters) of one end of the 1 inch (25 millimeters) wide organic strip. Attach a strip of reinforced pressure sensitive tape to the side of the organic strip opposite the adhesive, to extend this free end to about 8 inches (200 millimeters) in length. Place the end of the glass panel from which the organic strip was removed in the lower clamp of the tensile tester and and the free end of the tape in the upper clamp. Peel the remainder of the organic strip from the glass mechanically and obtain a record of the pull force value. Determine and record the average pull force value for each specimen from the chart. Weathered and control specimens are to be tested alternately.

(iv) *Interpretation of results.* The organic-coated glass adhesion shall be judged satisfactory if the average pull force for the weathered specimens is no less than 90 percent of the average pull force for the control specimens.

(2) *Tensile strength test (organic-coated glass only).* (i) The specimens for this test are the same 2 inch by 6 inch (5 centimeter by 15 centimeter) specimens used in the adhesion test.

(ii) *Apparatus.* The CRE tensile tester shall be used with the moving crosshead set to move at 2 inches per minute (0.8 millimeter per second) and the load range such that the specimens will break at 30 to 60% of full scale. A cutter shall be used containing new razor blades for cutting ½ inch (12 millimeter) wide specimens of the organic coating on the glass. The razor blades shall be used one time only.

(iii) *Procedure.* Using the ½ inch (12 millimeter) razor cutter, cut a straight strip of the organic coating in the lengthwise direction of the glass specimen for the full 6 inch (15 centimeter) length. Carefully peel this strip from the glass panel and test it for breaking strength in the tensile tester.

(iv) *Interpretation of results.* The organic coating tensile strength shall be judged satisfactory if the average tensile value of the weathered specimens is no less than 75 percent of the average of the control specimens. Weathered and control specimens are to be tested alternately.

(C) *Plastic (indoor service).* Specimens shall be judged satisfactory if, after the indoor aging test (paragraph (d)(2)(iii) of this section), they again pass the impact test (paragraph (d)(1) of this section).

§ 1201.5 Certification and labeling requirements.

(a) Manufacturers and private labelers of glazing materials covered by this Part 1201 shall comply with the requirements of section 14 CPSA (15 U.S.C. 2063) and regulations issued under section 14.

(b) Any glazing material that for accelerated environmental durability tests meets only the requirements of § 1201.4(e)(2)(ii)(C) entitled "Plastic (indoor service)" shall bear the statement "INDOOR USE ONLY" as part of a permanent label.

(c) Organic-coated glass that has been tested for environmental exposure from one side only must bear a permanent label on the coating stating "GLAZE THIS SIDE IN" and shall bear in the central 50 percent of the surface area the following message in letters at least ¼ inch (7 millimeters) high: "SEE PERMANENT LABEL FOR IMPORTANT MOUNTING INSTRUCTION." The latter message shall be attached to either side of the glazing by any means which shall ensure the message will remain in place until installation.

§ 1201.6 Prohibited stockpiling.

(a) *Stockpiling.* For the purposes of this section, the term "stockpiling" means manufacturing or importing the affected products between the date of issuance of this Part 1201 in the FEDERAL REGISTER and the effective date set out below in § 1201.7 at a rate significantly greater (prescribed in paragraph (b) of this section) than the rate at which the affected products were produced or imported during a base period (prescribed in paragraph (c)(2) of this section).

(b) *Prohibited acts.* Manufacturers and importers of glazing materials, fabricators, and manufacturers or importers of architectural products specified in § 1201.1(a) who incorporate glazing material shall not incorporate glazing materials which do not comply with the requirements of this Part 1201 into such products between the date of issuance of this Part 1201 in the FEDERAL REGISTER and the effective date set out in § 1201.7 below at a rate greater than the rate of production or importation during the base period (defined in paragraph (c)(2) of this section) plus ten percent. For wired glass used in doors or other assemblies subject to this Part 1201 and intended to retard the passage of fire, when such doors or other assemblies are required by a federal, state, local or municipal fire ordinance, the rate of production during the base period may be increased annually by no more than 10 percent.

(c) *Definitions.* As used in this § 1201.6:

(1) "Rate of production (or importation)" means the total number of affected architectural products incorporating glazing material not complying with this Part 1201 manufactured or imported during a stated base period.

(2) "Base period" means, at the option of the manufacturer or importer, any period of 180 consecutive days prior to January 6, 1977, said period to be selected within an interval which begins July 6, 1975.

§ 1201.7 Effective date.

The effective date of this Part 1201 shall be July 6, 1977; except that for glazing materials used in doors or other assemblies subject to this Part 1201 and intended to retard the passage of fire, when such doors or other assemblies are required by a federal, state, local or municipal fire ordiance, the effective date shall be January 6, 1980.

(Sec. 9(a), Pub. L. 92-573, 86 Stat. 1215; (15 U.S.C. 2058(a)))

Dated: January 3, 1977.

SHELDON D. BUTTS,
Acting Secretary, Consumer Product Safety Commission.

NOTE: Incorporation by reference provisions were approved by the Director of the Federal Register on December 30, 1976, and those materials are on file at the office of the Federal Register.

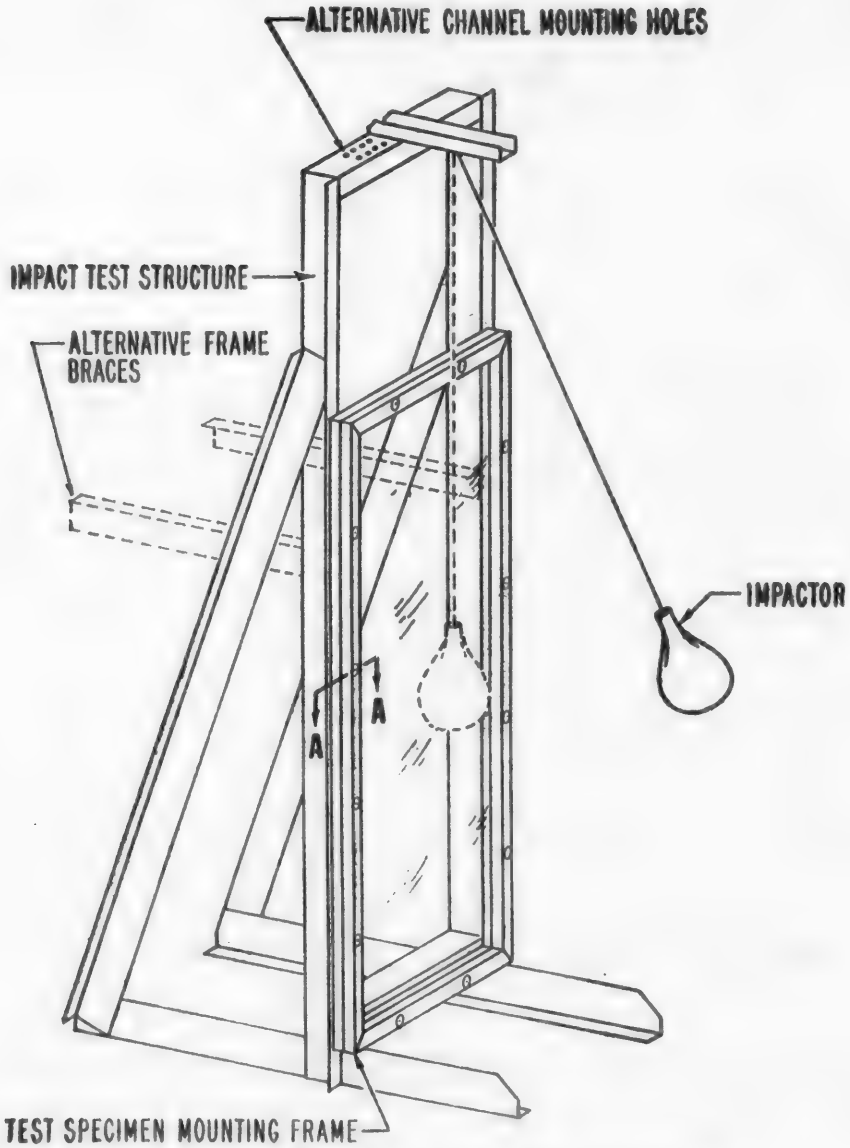

FIG I-GLASS IMPACT TEST STRUCTURE

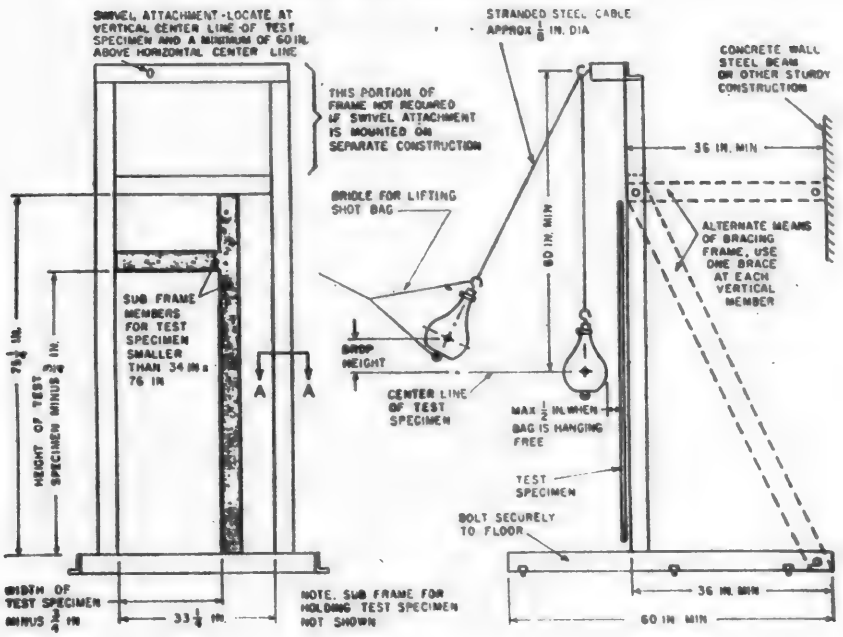
SWIVEL ATTACHMENT-LOCATE AT VERTICAL CENTER LINE OF TEST SPECIMEN AND A MINIMUM OF 60 IN. ABOVE HORIZONTAL CENTER LINE
THIS PORTION OF FRAME NOT REQUIRED IF SWIVEL ATTACHMENT IS MOUNTED ON SEPARATE CONSTRUCTION
STRANDED STEEL CABLE APPROX 1/8 IN. DIA
CONCRETE WALL STEEL BEAM OR OTHER STURDY CONSTRUCTION
36 IN. MIN
BRIDLE FOR LIFTING SHOT BAG
60 IN. MIN
ALTERNATE MEANS OF BRACING FRAME, USE ONE BRACE AT EACH VERTICAL MEMBER
SUB FRAME MEMBERS FOR TEST SPECIMEN SMALLER THAN 34 IN. x 76 IN
DROP HEIGHT
CENTER LINE OF TEST SPECIMEN
MAX 1/2 IN. WHEN BAG IS HANGING FREE
TEST SPECIMEN
BOLT SECURELY TO FLOOR
HEIGHT OF TEST SPECIMEN MINUS 3/4 IN.
WIDTH OF TEST SPECIMEN MINUS 3/4 IN
33 1/8 IN.
NOTE. SUB FRAME FOR HOLDING TEST SPECIMEN NOT SHOWN
36 IN. MIN
60 IN. MIN

FIG 2-TEST FRAME

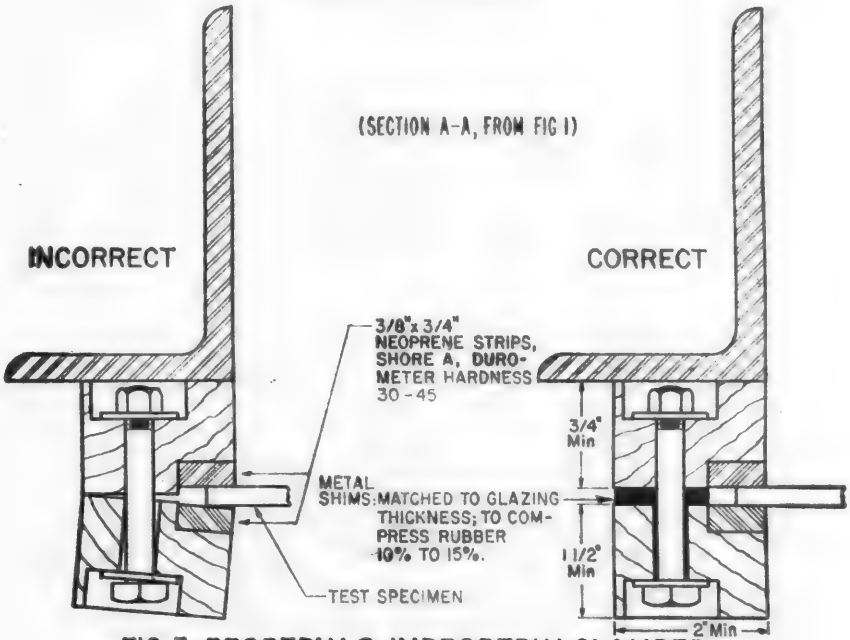
(SECTION A-A, FROM FIG 1)
INCORRECT
CORRECT
3/8"x 3/4" NEOPRENE STRIPS, SHORE A, DUROMETER HARDNESS 30-45
3/4" Min
METAL SHIMS: MATCHED TO GLAZING THICKNESS; TO COMPRESS RUBBER 10% TO 15%.
1 1/2" Min
TEST SPECIMEN
2" Min

FIG 3-PROPERLY & IMPROPERLY CLAMPED TEST SPECIMEN(>1/8" THICK)

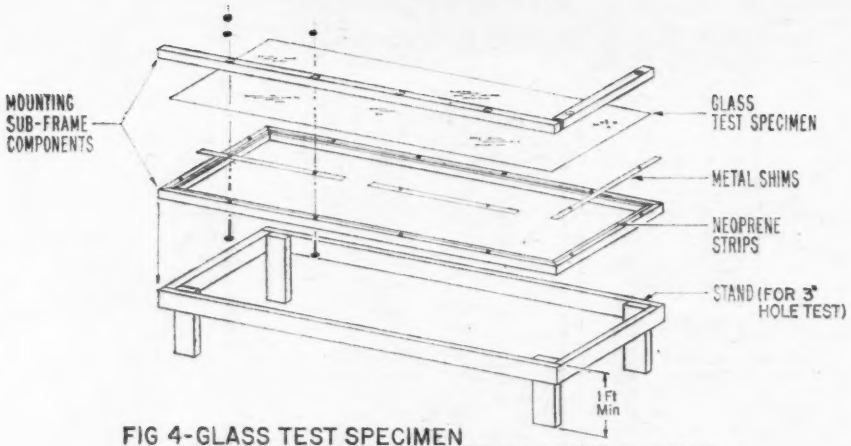

FIG 4-GLASS TEST SPECIMEN MOUNTING SUB-FRAME (EXPLODED) & STAND

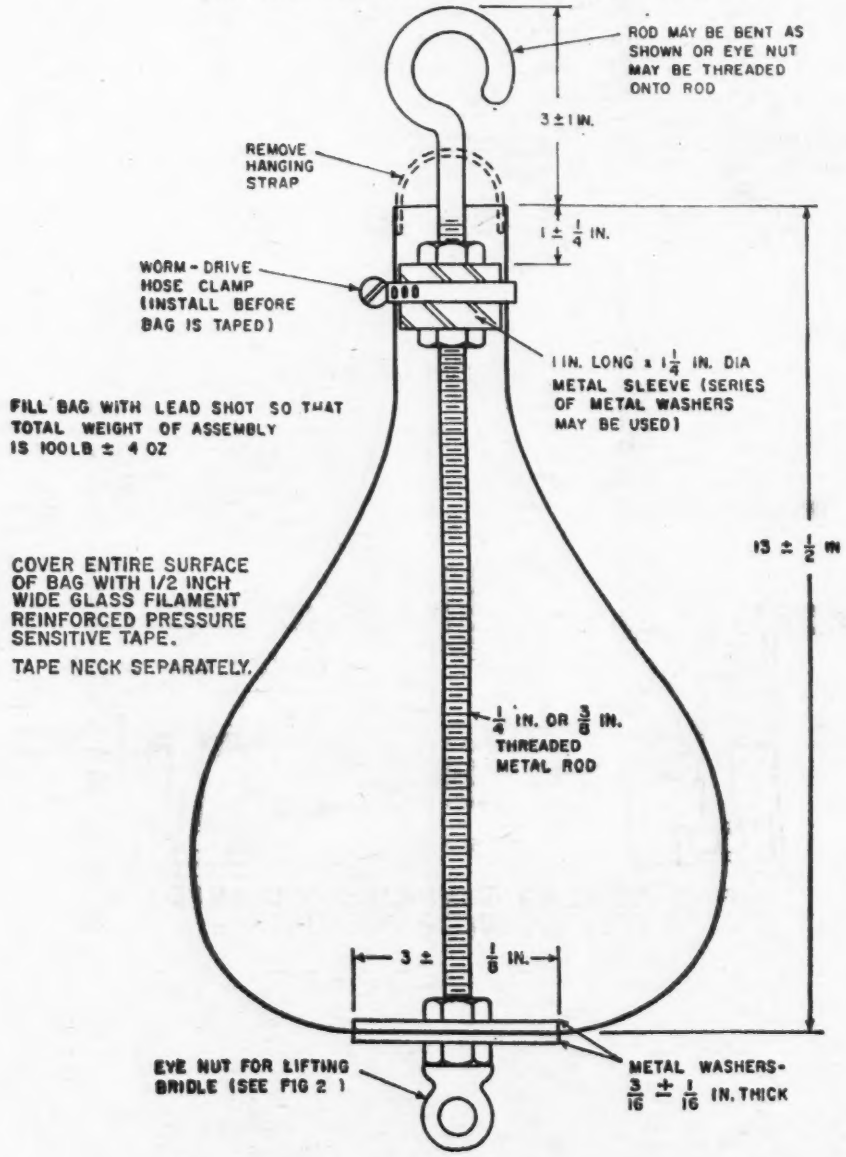
ROD MAY BE BENT AS SHOWN OR EYE NUT MAY BE THREADED ONTO ROD
3 ± 1 IN.
REMOVE HANGING STRAP
1 ± 1/4 IN.
WORM-DRIVE HOSE CLAMP (INSTALL BEFORE BAG IS TAPED)
1 IN. LONG x 1 1/4 IN. DIA METAL SLEEVE (SERIES OF METAL WASHERS MAY BE USED)
FILL BAG WITH LEAD SHOT SO THAT TOTAL WEIGHT OF ASSEMBLY IS 100 LB ± 4 OZ
COVER ENTIRE SURFACE OF BAG WITH 1/2 INCH WIDE GLASS FILAMENT REINFORCED PRESSURE SENSITIVE TAPE.
TAPE NECK SEPARATELY.
13 ± 1/2 IN
1/4 IN. OR 3/8 IN. THREADED METAL ROD
3 ± 1/8 IN.
EYE NUT FOR LIFTING BRIDLE (SEE FIG 2)
METAL WASHERS- 3/16 ± 1/16 IN. THICK

FIG 5-IMPACTOR

[FR Doc.77-478 Filed 1-5-77;8:45 am]

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